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ABSTRACT

Describing entries in the National Council of Instructional Administrators' (NCIA's) Annual Exemplary Instructional Program Awards for 1994-95, this volume presents descriptions of community college programs in the five categories in which they were submitted. The first section focuses on programs in the category of best use of technology for underprepared students, describing the two winning programs: the Student Tracking and Retention for Success program at Florida's Brevard Community College and the Writing Center at Washington's North Seattle Community College. This section then provides brief descriptions of the 35 other entries in the category. The second section describes exemplary programs using technology with transfer students, describing the two winning programs: the Student Research for Teaching Critical Thinking at Georgia's Darton College and the Student Created Computer Calculus Movies program at New York's Borough of Manhattan Community College. Descriptions are then provided for the 13 other entries in the category. The third section then describes programs using technology with occupational students, identifying the Computer Training Program for Physically Challenged at Texas' El Centro College as the winner and the Small Satellite Project at California's Sierra College as an honorable mention and describing the 19 other entries. The fourth section describes two entries in the category of recruitment and retention of minority faculty, indicating that no award was made, while the fifth describes programs using technology in staff development. This section identifies the Professional Growth Center at Illinois' College of Lake County as the winner, highlights two programs receiving honorable mention, and provides descriptions of the 15 other entries. Includes an index of participating colleges. (TGI)

ED 396 782

Community College Exemplary Instructional Programs Volume VI

1994–1995

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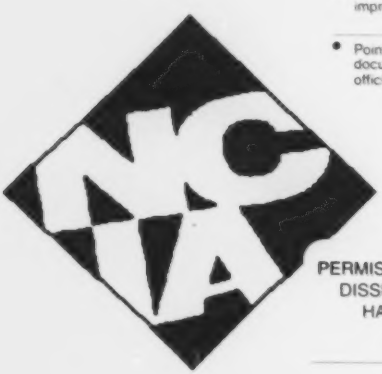

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Community College Exemplary Instructional Programs Volume VI

1994–1995

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INTRODUCTION

Community College Exemplary Instructional Programs, 1994-1995 is the volume of outstanding academic programs published by the National Council of Instructional Administrators (NCIA).

This present volume contains five sections corresponding to the five categories in which programs were originally submitted to NCIA for its Annual Exemplary Instructional Program Awards. These awards are presented at the annual AACC convention held each April.

Section I includes the description of two programs which won the award for best program using technology with underprepared students. Edited versions of all other entrants are also included.

Section II includes the description of two programs which won the award for best program using technology with transfer students. Edited versions of all other entrants are also included.

Section III includes the description of one program which won the award for best program using technology with occupational students. An honorable mention is also contained. Edited versions of all other entrants are also included.

Section IV includes the edited description of the two entries in the category best program for recruitment and retention of minority faculty. No award was made in this category.

Section V includes the description of one program which won the award for best program naming technology in staff development. Two honorable mentions are also included. Edited versions of all other entrants are also included.

In all, 94 programs are described herein.

Each program cites the institutional contact person, the college address and phone number and the name of the CEO. An "Index of Participating Colleges" is contained at the end of the book.

Programs were nominated as exemplary by the participating colleges. Each college determined the category or categories in which to compete. Program narratives were restricted to a maximum of 1000 words. For this volume some editing for style and length has been done.

Programs submitted were required to address three criteria in their narrative:

1. Must identify how the program is innovative and creative.
2. Must provide measures of program success.
3. Could be adopted/adapted by other two-year colleges.

In certain instances colleges chose to address each of the criteria in turn within their narratives. In other instances colleges generally covered the criteria, but with no direct reference to them.

Beyond presenting its awards, the National Council of Instructional Administrators makes no judgment on the merit of individual programs, but is pleased to include programs as submitted. Program evaluators were selected by the NCIA Executive Board from colleges not submitting entries.

The Council is pleased to provide, as part of its membership services, a copy of this publication to institutional and individual members. On a periodic basis the Council publishes other materials of interest to academic administrators. A quarterly Newsletter is also distributed to all NCIA members.

Additional copies of this publication are available for $15.00 each. Orders may be sent to NCIA, P. O. Box 198642, Nashville, Tennessee 37219-8642. Checks should be made payable to NCIA.

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SECTION I

PROGRAM AWARD WINNERS

STARS -- Student Tracking and Retention for Success
Brevard Community College
1519 Clearlake Road
Cocoa, FL 32922
(407) 632-1111
C.E.O.: Maxwell C. King
Contact Person: Elena Flom

Strategy Narrative: In 1991, Brevard Community College was awarded a multi-year grant by the U.S. Department of Education's Title III Strengthening Institutions program. The grant's theme is Student Success: its target populations are at-risk and underprepared students. Our program was recognized by the USDE in 1993 and 1994 as an exemplary model of what can be accomplished when faculty and technology work together with institutional support to nurture students.

The Student Success Project at BCC, known as STARS (Student Tracking for Retention and Success), has only one activity: improvement of academic programs and student services to increase the success of developmental students from enrollment through graduation. This goal is being achieved through three major objectives:

- Implementation of an effective student mentoring and intervention program
- Establishment of two Computer-Aided Instruction (CAI) Labs
- Expansion of faculty and program development opportunities

Innovative technology implementation has been the chief tool by which these objectives are being achieved.

Studies have been conducted comparing successes of first-time-in-college, underprepared students who received mentoring, CAI, or both to those of first-time-in-college, underprepared students who have not received assistance. Overall, students who had Title III assistance show a 49.7% completion rate of prep classes after two semesters while students not receiving assistance have a 39.9% completion rate. For minority students who receive Title III assistance, completion is 45%; for those not receiving assistance, the completion rate is 36.3%.

The backbone of the project is a comprehensive student data base, built to identify and track underprepared students. It is capable of tracking students for 10 years, accepting up to 584 variables. Underprepared students are identified by ASSET test scores, required of all new enrollees. Students scoring below certain cut-offs are required to take preparatory courses in math, English, and reading, depending on their needs. They are also strongly advised to enroll in SLS 1101, College Success Skills, where they are given the opportunity to work with a mentor, volunteer administrators, staff or faculty members, as an advisor and friend. Mentee-mentor

matches are made by computer but may be adjusted by SLS instructors. To date, 1,051 students have been paired with one of 209 trained mentors.

To effectively advise at-risk students, mentors must have access to accurate and current information about their mentee's progress as well as information about college programs, facilities, and policies. Information access of this nature was accomplished by upgrading the college mainframe computer, constructing a thorough student tracking system, and providing each mentor with a desktop terminal connected to the mainframe computer. At their fingertips, mentors have their mentees' academic history, their current schedule, counseling and advising databases, and other relevant information.

- Studies conducted on student retention show that 79% of underprepared, fall term students enrolled in SLS 1101 returned for spring term, while only 63% of those who did not take the course returned
- For remaining fall term students, 88% of SLS enrollees returned while only 69% of non-enrollees returned
- Student surveys show that 90% would recommend the course and the instructor to other students.
- Additional studies show an increase in G.P.A. of mentored students and higher prep course completion rates.

Students enrolled in prep courses on the Melbourne campus have the opportunity to work in a 60 station Computer-Aided Instruction Lab with a myriad of educational software packages for remediation in reading, writing, and math. Instructors use the lab for both assigned and supplemental work in prep courses.

- Studies of CAI use on persistence in college show CAI students persisting over two consecutive terms at a rate of 74.4% compared to 69.5% for concurrently enrolled non-CAI students.
- Prep Course completion rates are also greater for CAI students; in reading, CAI students show a 19.9% greater completion rate than non-CAI students after one term of study.
- Student end of the term surveys show that 75 to 82% feel that CAI use improved their grades.

A CAI lab utilizing the comprehensive software package, PLATO, opened on the Cocoa Campus in October, 1994. Studies comparing the impact of the two labs on underprepared students will be conducted with data collected beginning in the 1995-1996 academic year.

Faculty development is the third objective of the grant. Surveys indicated that faculty desired training in the use of computers, ideas for effectively integrating computer use into their curriculum, and most importantly, time for implementing the changes. The Title III program has accomplished these tasks by sponsoring computer training classes and workshops, attendance at off campus seminars and conferences, and by funding curriculum projects with release time. Some on-campus workshop topics have been Enhancing Student Learning in Your Class, Winning at Math, Multimedia in Your Classroom, Constructing a Better Test, and

Diversity: Today's Changing Student Population. The majority of workshops leaders were BCC faculty who shared their expertise with colleagues.

Title III funds curriculum projects for faculty who wish to produce a product customized to their own instructional delivery. Faculty are supported in their efforts with release time or overload pay, and with a computer and necessary software. These projects support both at-risk students enrolled in prep courses, and at-risk students as they progress into other academic areas. Projects completed thus far include Competency based prep reading, writing and math courses, interactive tutorials, CLAST English Review, Basic Chemistry Skills, and Computer Aided Physics. Seventeen additional projects will be funded for Spring Term, 1995 in many new disciplines.

Many of these projects are showcased in the annual Title III sponsored mini-conference Celebrating Teaching Excellence: The New Technologies. This annual event offers all faculty the opportunity to keep up-to-date on successful technological integration and innovation being done by their colleagues, and to share ideas for future projects. Attendance last year totaled 155. A survey of faculty and staff regarding Title III staff development activities revealed that 92.5% of respondents feel they have experienced increased enthusiasm and that their program has improved as a result of their attendance at a Title III sponsored activity.

The Loft Writing Center Plus
North Seattle Community College
9600 College Way North
Seattle, WA 98103
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C.E.O.: Peter Ku
Contact Person: Carolyn Lord

As both common sense and research indicate, one of the major problems with underprepared and limited English proficiency students is that they don't stick around long enough to get substantial benefits from their education. During the late 1980's, North Seattle Community College adopted a number of strategies to deal with this problem. One strategy involved the integration of technology into the campus writing center, known today as the Loft Writing Center Plus.

The mission of the Loft Writing Center Plus is to enhance student English language reading, writing, and speaking skills through individual and small group tutoring in a positive, multicultural environment. Services are free and available to all students at the college. Loft services include one-on-one tutoring help in writing, reading, and speaking; small group tutoring; tutor- and computer-assisted self-study; a reading improvement center; and a state-of-the-art English language laboratory.

The English language laboratory opened in November of 1992. Funding for both hardware and software came primarily from a Title III grant. The lab offers 22 Macintosh IIsi computers and CD-ROM drives for individual work on interactive software for listening, speaking, reading, writing and pronunciation. The computers are networked with Ethernet. One computer is connected to a large monitor which is used to display software in student orientations. The lab also features VCRs and monitors for students to watch videos with close-captioning which improves

listening and reading. A bank of cassette players is available for students to listen to books on tape. Recorders are also used for pronunciation analysis.

As a part of the Loft Writing Center Plus, the lab is staffed by trained tutors who are qualified to help students with the content of the software programs as well as with computer use. Training is on-going, and the tutor training program is certified by the College Reading and Learning Association. Students using interactive multimedia computer programs have constant access to tutors who answer questions and model accurate English pronunciation.

One strategy that works particularly well in the Loft is the balance between human contact and technology. We have found that underprepared students tend to have difficulty working in isolation, or in situations where they are self-monitoring. Each time they come in to the Loft, students have contact with tutors. Around the edges of the Loft, reading and writing tutors sit at tables with students. Students are free to go back and forth between the tables and the computer workstations, and tutors often work with students in both settings. Students can "drop-in" to the Loft any time during regular operating hours.

Another connection that has contributed to the successful integration of the Loft into campus life is the involvement of faculty. The coordinator of the Loft regularly attends faculty meetings in order to provide services that are most needed by faculty and students. Faculty members regularly visit the Loft with their classes to provide orientation. Some faculty have integrated Loft sessions into their course syllabi. Most often faculty use the commercial programs available in the Loft, like "Mac ESL" and "American Accent." A few faculty, however, have used Hypercard to write software programs specific to the needs of their students. Programs created in the Loft include: "Seattle, the Emerald City," an orientation to Seattle that works on reading skills and vocabulary; "Converse and Communicate," which lets students interact in the context of real life situations by linking computer and video technology; and "Hyperstudy," which helps students improve their study and reading comprehension skills. These activities and others have contributed to a high correlation between classroom activity and the services available to support that activity.

We know anecdotally that the Loft is helping our students succeed, but it is exciting for us to see that the impact is quantitative as well. In a pilot study of Loft users between 1992 and 1994, we found that students who used the Loft were much more likely to progress than students who did not. In the case of both developmental English and ESL students, use of the Loft's services had a significantly positive impact on students' likelihood of remaining enrolled at NSCC over subsequent quarters (86% vs. 52% for developmental English students, and 80% vs. 45/O for ESL students). Use of the Loft also had a significant impact on the likelihood of taking and passing college-level English (75% vs. 54% of developmental students, and 29% vs. 12% for ESL students). We also found that 17% of Loft users had graduated as of fall 1994, compared to only 9% of non-Loft users.

Student use of the Loft continues to grow as word of the Loft spreads on campus. During the first quarter of operation, fall of 1992, we provided about 1800 sessions to 400 students. During fall quarter 1994, we offered approximately 5600 sessions to 800 students. That's an increase of over 300% in the number of sessions we provided to help our students succeed. The demand continues to increase.

Word of the Loft is spreading off campus as well. On average, we receive a couple of visits per week from groups that are considering similar facilities for their own institutions. Our visitors have been local, national, and international, including representatives from Czechoslovakia, Slovakia, China, Taiwan, and Korea, to name a few. Staff have also had the opportunity to share information about the Loft at national conferences, including the national Title III conference in 1994 and a League For Innovation conference in 1993.

We feel strongly that this facility has made a big difference for our underprepared students. Even those with little or no previous exposure to computers thrive in the supportive environment of the Loft. Students leave not only better prepared to deal with the English language, they are also better prepared to survive in the technological world in which we live.

SECTION I ENTRIES

ABLE (Adult Basic Literacy Education) Program
Central Piedmont Community College
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Charlotte, NC 29235
(704) 342-6566
C.E.O.: P. Anthony Zeiss
Contact Person: Cynthia Johnston

ABLE (Adult Basic Literacy Education) Program Central Piedmont Community College initiated a unique instructional program in 1983 to teach adults basic skills. The uniqueness of the ABLE program is its use of technology to teach basic reading, writing and math skills in neighborhood centers allowing adults learning opportunities during hours convenient to them and providing an opportunity to increase their educational levels at a faster rate than traditional programs. The goals of ABLE are: 1) to provide learning experiences for students to improve reading, writing and math skills to a GED level more quickly than could be expected in traditional programs; 2) to attract adults who might not otherwise enroll in a basic skills program; 3) to retain adults in the program to a greater extent than traditional programs; 4) to provide support, referral and instruction which will assist adults in meeting life goals such as continuing education, obtaining employment or becoming more effective parents.

ABLE has incorporated a variety of instructional methods including individualized instruction by computer, audio and videotape, television, print materials and one-to-one tutoring using over 250 volunteers each quarter. Research and development in curricula are ongoing. Over 10,000 adults have enrolled in ABLE since the first center opened in a shopping mall in 1983. Today, approximately 650 adults are served quarterly in the ABLE centers housed in a shopping center, a YMCA, a neighborhood community center and in a county jail facility. ABLE is funded as a component of the Adult Basic Education department at CPCC.

Assessment and placement procedures have ensured proper placement in the program resulting in better retention due to immediate success. Student success rates continue to improve. For example, students in the lower reading level (0-4) complete a skillbook in an average of 34.2 hours. Upper level reading students (5-8) increase a grade level in an average of 29.4 hours. Students in the math curriculum increase a grade level in an average of 9 hours. Pre-GED instruction is also available using computer software. GED preparation students have a 100% pass rate as a result of completing the ABLE program.

ABLE program faculty and staff continue to research and develop new and innovative methods for teaching basic literacy skills to adults. Developed with a FIPSE grant from the U.S. Department of Education, the Learning Styles Survey interactive videodisc has allowed the assessment of the preferred learning styles of low-literate adults. The READY Course, a reading comprehension instructional program with digitized audio, and the NEW READER BOOKSTORE, a phonics-based beginning reading program, have been developed and are used across the nation. The ABLE program has been replicated at community colleges in North Carolina with funds from First Union Bank and at other educational institutions across the nation.

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The program has been recognized in numerous journals and newsletters such as T.H.E. Journal, The Chronicle of Higher Education, the Business Council for Effective Literacy, the Adult Literacy and Technology Newsletter, and the Wall Street Journal. ABLE was also the recipient of the U.S. Department of Education Secretary's Award for Outstanding Adult Education Programs in 1989 and of the local Golden Book Award from ReadUp Charlotte in 1991. ABLE was nominated for the 1987 President's Volunteer Action Award and for the 1992 President's Annual 1000 Points of Light Award. In 1987, Barbara Bush visited to recognize the 350 volunteers tutoring in the program, and again visited in 1988 on her own initiative. Hillary Clinton visited in April of 1992 to observe the services offered to homeless men, women and children through the program. One of the ABLE students was recognized as a National Adult Learner of the Year in 1989.

Collaboration with other institutions and agencies has allowed us to serve the homeless population, JOBS participants, JTPA and DSS clients as well as to establish Family Literacy programs in three preschools. With the development of multi-campuses, each will house an ABLE program which will expand the use of computers and technology to serve underprepared adults throughout the county.

Academic Skills Lab
Longview Community College
500 SW Longview Road
Lee's Summit, MO 64081
(816) 672-2211
C.E.O.: Aldo Leker
Contact Person: Leta Tyhurst

The Academic Skills Lab, established on the Longview Campus of the Metropolitan Community College system, offers computer-assisted instructional support to a diverse population of underprepared, learning disabled, and other developmental students. The lab, developed cooperatively by the Learning Center, Reading Department, and testing personnel to support at-risk students in their academic and/or vocational endeavors, promotes student learning, enhances opportunities for student success, and contributes to retention of students through the use of computer-assisted diagnostic testing, placement, and instructional support.

In 1992-93, a pilot project funded by the Metropolitan Community College District Task Force to study the effectiveness of computerized reading diagnostic testing and skill development indicated that students who used computer-assisted learning scored significantly higher on reading post tests. As a result of the initial success of the program, funding was sought to expand the pilot into a multi-discipline computer lab/classroom demonstrating a holistic integration of learning through technology with the goal of supporting developmental programs.

In creating the lab, our concerns included: 1) the need to provide computerized diagnostic assessment for students for effective placement 2) the need for computerized, individual supplemental instructional support for basic skills students 3) the need to evaluate student success upon completion 4) the need for computer-assisted instructional support for academic disciplines beyond the basic skill level and 5) the need for access to learning and study strategies.

We started the program with six computers and some software funds. Based on results measured by student and faculty surveys and the Learning Center's students served report, we were allowed an additional twelve computers, a furniture allowance, and additional software money for a second year of development. We are establishing an eighteen station computer classroom/lab for individual student usage, as well as for accommodating instructors who wish to bring their basic skills classes for instruction. This year we are establishing control and experimental classrooms in developmental reading to track student progress and measure outcomes. As the program grows and lab usage accelerates, we are excited about the opportunities to track student progress longitudinally and assess outcome measures.

Currently, computer-assisted instructional support is offered for reading, spelling, math, English, psychology, economics, and engineering dynamics classes. Another plus for the Academic Skills Lab is that as publishers make more software available to accompany textbooks, all students come searching for it. Therefore, the stigma of the Academic Skills Lab being just for the underprepared is reduced.

Computer-assisted instruction allows the learning disabled or underprepared student the opportunity to repeat and practice a newly taught skill or concept as much as necessary to become comfortable with the new material, all within the privacy offered between a student and a computer screen. As students tell us, "I don't have to be embarrassed to ask an instructor or a tutor to repeat the same thing over and over." Also, as students move beyond their basic skills classes, they still have the support of computer-assisted instruction as computer software to accompany textbooks becomes available.

Access Learning Center
Amarillo College
2200 S. Washington St.
Amarillo, TX 79109
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Contact Person: Ann Hamblin

An injured 38 year old Hispanic male, a 20 year old dropout from Peru, New York, a federal government employee, a 31 year old Laotian trying to learn English, a high school senior expelled from his classes, a struggling college student, a 47 year old man reading below a fourth grade level, a local PTA president, and a pre-nursing student all have one thing in common--the Access Learning Center. All of these individuals, striving to complete their own personal goals, work side-by-side within the Center building their basic skills. What began eight years ago as a dream has emerged into a flourishing reality. The dream of helping "any one", of "any age" at any "basic educational level" at any "time" came into fruition through the combination of a vision, a belief, and technology. The vision was to set up an open-entry/open-exit learning center which would be flexible enough to accommodate the gamut of varying skill levels. The belief is that all can learn That belief coupled with the principles of "mastery" learning through "individualized instruction", iced with the latest technology helped establish the Access Learning Center.

Adult Education Computer Center of the Adult Education Institute

Prairie State College
202 S. Halsted St.
Chicago Heights, IL 60411
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C.E.O.: E. Timothy Lightfield
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The Adult Education Computer Center at Prairie State College was established to support the wide range of programs which make up the College's Adult Education Institute. The Adult Education Institute includes programs for Adult Basic Education, Adult Literacy, GED Studies, English as a Second Language, Family Literacy, Workplace Literacy and other programs which reach out to the underserved and underprepared people of the College's service area. In 1994, these programs generated more than 7200 enrollment hours for more than 3220 students.

Students who enroll in the Adult Education Institute are overwhelmingly female, minority, and residents of economically depressed areas served by Prairie State College. The majority of them receive some kind of public aid or are involved with the JTPA Opportunities Program or Project Chance. For these students, past experiences with school have been unsatisfactory or limited. For them, the best chance for a better future is one more chance at an education. The mission of the Computer Center is to help students derive every possible benefit from that chance by enhancing their learning experience, increasing their ability to communicate, providing individualized instruction and tutoring, introducing them to basic computer skills, and making the Adult Education Institute more effective by providing a mechanism for tracking student needs and student success.

The Adult Education Computer Center provides fourteen computers in a lab designated for student use and three computers assigned to administrators. The computers are linked in a LAN network and then loaded with software which related to the classes provided by the Adult Education Institute. Software available for networks is more suitable for adult students than most programs licensed for individual use. The network makes computer assisted instruction possible in a classroom setting, an option used by many of the Institute's instructors. One important benefit is that nontraditional students now encounter learning in a user friendly environment.

The Computer Center is accessible to all students as a study aid in all subjects offered by the Adult Education Institute. GED students can experience practice tests. Individual students can focus on specific areas which need reinforcement. Students and instructors can communicate freely and conveniently using e-mail. Newsletters can be generated to stimulate student interest and keep them informed of activities. The Center creates a sense of involvement on the part of the student which enhances the classroom experience and permits a degree of individualism in instruction that would be impossible without the network.

In addition to the traditional literacy which these programs develop, there is now an additional element of "computer literacy" which will make these students more effective in the highly competitive arena of the work place. The Adult Education

Institute Computer Center is designed to help students achieve success in those skills which will open doors both to higher education and to a better life.

Because the State of Illinois does not report on those GED students who successfully complete the test, the College has no real data to measure the success of its students in that area. Current research using information generated by student use of the network suggests a positive correlation between use of the network and student progress. The ABMath, ABReading and ABEnglish classes, for example, require that a student pass a test before moving up to the next level. Instructors have noticed "dramatic" improvement since the computer lab was introduced, reporting that students seem to move up levels almost 50% faster than before. English as a Second Language programs report similar results. In addition, there seems to be a positive correlation between use of the network and student retention.

Administrators are able to track every student's computer usage because the network demands a "login" procedure. This simplifies administrator tests in reporting student achievement and attendance in programs such as the JTPA Opportunities grants and Project Chance. Instructors and administrators are able to evaluate student needs more accurately and more efficiently because each student's use of the network generates a records of achievement.

What Prairie State College has done is to pay the same careful attention to the needs of the underprepared and underserved members of the community that an innovative and caring institution pays to its traditional students. What the Adult Education Computer Center is creating is an expectation of success that will enhance each student's potential to achieve success. What the Center makes possible is a new energy devoted to raising the level of literacy in the community which the College serves. What the computers will make possible is a growing understanding of the concrete educational needs of this large, disadvantaged population based on data which now can be accessed quickly and in some detail. Because the equipment and software are easily accessible to all, this center could be duplicated at any institution willing to develop and customize its own LAN network. What we have created is a laboratory in which we, the College, can learn how best to help others to learn.

ASSIST (Additional Student Services Instructional Support Team)
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Contact Person: Linda McCann

Oakton Community College's ASSIST Program has implemented a strategy to teach the transfer of appropriate accommodations and assistive technology for students with disabilities from the educational setting to the workplace. During an intake interview, students are matched with the accommodations and assistive technology which gives them an equal access to education. For example, a student with a learning disability may need to use an electronic spell checker; a hard of hearing student may need an FM system; and a student with limited vision may need to use

a Visual Tek. During an orientation program for incoming freshmen, these students are then taught how to approach instructors to request accommodations and explain the assistive technology they will use. Students are given the opportunity to role play these situations. Self-advocacy skills begin to develop.

Oakton's students with disabilities also work in small groups through a series of learning modules designed to help them set realistic career goals and to teach job search skills. They explore what accommodations and technology they will need to perform the essential functions of the jobs they have chosen. In addition, they practice how to request these needs in a professional, appropriate manner.

To further the understanding of the importance of technology for persons with disabilities, a Citizen's Advocacy Council has been established. This group is comprised of local business and government leaders along with staff from Oakton's Special Needs Department. One of the goals of the Council is to explore the transfer of appropriate accommodations and assistive technology from the educational setting to the workplace. Council members share experiences they have had with the hiring, retaining, and advancement of persons with disabilities using technology. They then share this information they have had with the hiring, retaining, and advancement of persons with disabilities using technology. They then share this information with community civic/business organizations such as the Chamber of Commerce and Rotary International.

It should be noted that congressional committee research during the ADA hearings found that two-thirds of the working are population of people with disabilities were unemployed. These findings also indicated that many employers were concerned that employing people with disabilities would cause their businesses undue financial burdens. Oakton Community College's strategy to address these issues demonstrates that persons with disabilities can be successfully integrated into the workforce when self-advocacy training, technology, and public awareness are combined.

Associate Degree Nursing Program
Golden West College
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Nursing is a very complex activity and has become even more complex with the advent of prospective payment and other health care reimbursement changes. In this time of increased complexity in nursing practice due in large part to economic and demographic changes, it is crucial that nurse educators guard against reducing standards which could result in underprepared nurses being graduated to care for an unsuspecting health care consumer. At a time when students electing to pursue nursing careers are "different" i.e., of more average abilities, less motivated, with poor English language skills, then nursing programs must experiment with new methods and new learning activities which will allow this "different" student to ultimately meet the same standards of excellence that nursing practice requires.

Golden West College Associate Degree Nursing Program has created an innovative curriculum that is responsive to the changing health care and employment needs of the community while at the same time accommodates the student with special needs. In order that the nursing students can maximize their learning opportunities, they are introduced to a method of identifying their own personal learning style prior to beginning the first semester of the program. Not only is a diagnostic tool used to identify the unique learning style of each student, but suggestions are given to use this style to the student's advantage. Additionally, student support for individualized learning styles and needs is provided through several tutorial centers at Golden West College. The campus provides assistance through reading, writing, and math labs where students with learning difficulties can receive individualized tutoring. Finally, the California Student Nurse's Association chapter at Golden West College has designed a mentoring system to support students in need.

The Nursing Program's curriculum is delivered in modular format. Each instructional module contains behavioral objectives and clinical outcomes which guide students to perform at a satisfactory level. The didactic portion of each module is coordinated by a team of nursing faculty. The teaching teams meet on a weekly basis to plan and coordinate learning experiences for students in the classroom and clinical agencies. Theoretical content is covered in general assembly sessions (GAS) and small assembly sessions (SAS). The entire class meets together for the GAS while the SAS has a 1 to 12 or 15 teacher-student ratio. The general assembly sessions are in lecture format. Selected modules are covered in these class sessions which are one to two hours in length. Small assembly sessions are intended for discussions, clarification, and amplification of the modules. A variety of creative methods of teaching are used to enhance the learning process by involving the student: case studies, mind mapping, care plans, student presentation, games and group work. This format encourages active student participation, self-direction and requires advanced preparation for class. These SAS sessions are one to two hours in length.

In addition to learning modules the curriculum is supported by specific nursing texts. Golden West College is proud to say that several faculty members have authored articles and books used to support the curriculum as well as being used nationwide by other schools of nursing.

Student participation in learning is expected in other than SAS sessions such as in the practice of psychomotor skills in the health science multi-media lab. The program has a "state of the art" multimedia and computer lab in which students view media and practice specific nursing skills prior to being assessed by a faculty member. Demonstrations and individual instruction are provided as necessary. Students use interactive computer programs which allow the students to learn at their own pace. In addition, faculty develop ways to use the multimedia lab to its maximum: computer programs, interactive videos, producing videos, taping sessions of classroom material, as well as skills to be shown to the students. Using these different forms of presenting information aids the underprepared students to understand and apply what they learn. Additionally, the faculty's involvement in media development and hospital practice bring the most current technological health care changes to the curriculum.

The Nursing Program's best indicator of success is the national licensing examination results. At this time, we enjoy a 96-97% pass rate for the first time

takers. Another measure of the success relates to the number of graduates receiving jobs. In recent years the percentage of graduates receiving jobs has been 90%. A final indicator is employer's evaluation of the graduates in which it is reported that graduates of the Golden West College Associate Degree Nursing Program perform in their job classification at a higher than average level than is expected of new Associate Degree Nursing graduates.

The modular approach used in the nursing program, as noted above, adapts or may be adopted by any nursing program. In fact, the module makes it very easy to teach nursing because it is a guide for both students and teachers. The student is able to assess his/her own learning needs since there are specific objectives delineated in measurable terms. The required and suggested reading are listed as are the evaluation tools. This is a very effective tool to use for any nursing program and multi media lab. In summary, this innovative and creative program develops the curriculum to address the issues and needs of the underprepared student. The program has measured its success by national licensing examination results, graduate employment rates, and level of performance in nursing roles once employed. Furthermore, this program may be easily and successfully adapted or adopted by any other nursing program.

Basic Writing
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The Basic Writing program at Bucks County Community College was designed to assist underprepared students reach two broad objectives: 1) the development of the writing skills needed to advance to higher level composition courses; 2) the awareness of how students' personal habits, skills, and attitudes influence success in both academic and employment settings.

This second objective makes our writing program unique. The need for this objective comes from an observation that many of our students, particularly our younger ones, adhere to the "entitlement ethic." They are entitled, they believe, to happiness, affluence, a college degree, and a high paying job without understanding what it takes to reach these goals. They are inexperienced in what has been called the three D's of the puritan work ethic: discipline, dedication, and delayed gratification.

When these students enroll in college and go in search of employment, however, they meet professors and employers who expect them to set and reach realistic goals, monitor their own performance, and evidence the job skills, habits, and attitudes associated with the work ethic.

Many teachers of underprepared students would concur with this observation, but even the most dedicated and caring of them would be reluctant to sacrifice course content to deal with what might be considered a personal development issue. However, since many of the underprepared students enrolled in community colleges today have little awareness of the characteristics that would make them successful

students or employees, we believe this area must be the concern of developmental education instructors. Further, we believe that writing is a powerful tool for learning and self- awareness.

Therefore, we developed a text, The Basic Writing Notebook, which includes a series of writing assignments that help students focus on these issues without sacrificing course content. In addition to working on grammar, usage and mechanics, students complete writing tasks that help them assess their skills, habits and attitudes.

These assignments include writing journal entries that require goal-setting and self-evaluation, interviewing professors and personnel directors, reading and summarizing articles written by experts in the job search area, and researching a particular job area and writing a letter of inquiry/application to an actual employer.

To meet the goals of our writing program and to help students become comfortable with the technology needed for both their academic work and for employment, we looked for ways to incorporate this technology in the course. For example, to facilitate their career research, the Director of the Career Center taught students to use the System of Interactive Guidance and Information (SIGI Plus) and the Vocational Information Through Computer Systems (VICS).

Then, in 1992, through a Title III grant, the Department of Basic Studies (now called Developmental Education Services) of which the Basic Writing program is a part, established a computer lab offering students tutorial assistance supplemental to classroom instruction.

The Lab, which is currently housed in the Library, consists of a 12 work station IBM DESKlab, and two laser printers. Through cabling and installation of cards on other computers on campus, software from the DESKlab server was networked to serve additional stations.

The software programs available were integrated into the Basic Writing program. Students now have the opportunity to receive supplemental instruction in grammar and sentence structure, to learn a basic word processing system, and to use a writing process program. For many students, this has been their first opportunity to become familiar with personal computers and to develop keyboarding and word-processing skills.

To determine the value of this added technology, Basic Writing students participated in a study during the spring 1993 semester to measure the effect of computer-assisted instruction on student retention and on skill achievement.

Writing students in both control and experimental groups were pre-tested on the computer with College Board Accuplacer. Those in the experimental group were offered use of the computer-assisted tutorial programs supplemental to classroom instruction. Writing students had access to the following software: CSR Writing, Writer's Helper, Microsoft Works, Learn About Your Computer, and course textbook software. Students in the control group did not have access to these programs, but both groups received equal amounts of instruction within the "traditional classroom setting."

At the end of the semester, students in all sections were post tested with the College Board Accuplacer. These data were converted to a Lotus program and the pre and

post test files were merged and analyzed using the Statistical Program for the Social Sciences (SPSS). Raw score pre to post test score difference was calculated as was a t-test statistic between the means of the experimental group and the control group.

After grades were issued for that semester, a transcript search of both experimental and control groups was conducted to determine whether the students had enrolled for the fall 1993 semester. A percent retention rate was then computed for both groups, and a chi-square test of significance was administered.

There was a significant difference between the experimental group and the control group's mean growth in writing achievement ($p=.003$) and their retention ($p=.04$). In other words, the improvement of the writing/grammar skills of students in the experimental group was significantly higher than that of the control group. In addition, students in the experimental group were more likely to enroll in the next semester than students in the control group.

Further, we surveyed students to determine their reaction to working with the computers. Almost without exception, the students said they were pleased to be developing skills that they knew would be important to them in both college and the work world.

By integrating technology into the existing Basic Writing program, we are now able to offer students a comprehensive course that addresses not only the development of essential job/academic skills--writing and the use of personal computers--but also the development of the positive work habits and attitudes that ensure future success.

The Center for Academic and Vocational Excellence (The CAVE)
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Strategy Narrative:

Neosho County Community College (NCC) serves an educationally disadvantaged population. In NCCC's service area, 35% of those over the age of 25 do not have a high school diploma. Of these, 46% have an 8th grade or less education. Eighty-two percent of NCC students are "first generation." Seventy-eight percent of NCC students are classified as non-traditional. This means sixty to seventy percent of NCCC students need remedial/developmental course-work. Concomitantly, attrition rates are high.

The Program: The CAVE

To address the issue past academic failure for most of NCCC's students, a multimedia learning style's laboratory was designed. The laboratory is named the Center for Academic and Vocational Excellence (CAVE). The CAVE is based on the learning theory of Dunn & Dunn at St. John's University.

Eight multimedia computers (i.e., sound cards, sound blaster speakers, CD-ROMs, graphics cards, and SVGA color monitors) are networked with a laser printer and other 486 PC's. The Novell/IBM Classroom network is loaded with reading, writing, and mathematics interactive drill and practice software and other academic software.

NCC hired a Computer-Aided Instructor (CAI) to assist faculty and students with incorporating the multimedia systems into their curricula. Specific curricula for remedial/developmental classes have been designed so instructors know exactly which computer programs to use with each section of their textbooks. Faculty have been offered an ongoing series of staff development programs to support computer-aided instruction. A key to quality use of technology is offering opportunities for faculty to build their computer skills. NCCC has striven to provide a solid foundation for the use of technology for underprepared students by regularly educating and updating CAVE faculty about the uses of technology.

Supplementing classroom lectures with computer-aided instruction allows faculty to shift the student's attention from one interrelated activity to the next. Students spend approximately 25 minutes of their time in the classroom and 25 minutes at the computer. Shifting activities from an auditory stimulation (lecture) to a tactile-kinesthetic and audio-visual environment (multimedia computers) gives the students varying levels of stimulation that facilities concentration and motivation.

Shifting curriculum activities permits the underprepared student to utilize more than one sense during a regularly scheduled class. Research has demonstrated that students who use various senses while learning have better retention of the material. Shifting activities keeps the student interested.

Students in the CAVE are given a sixty-minute training session on the multimedia computers. CAVE staff are readily available during operating hours to assist students on the systems.

NCCC has developed an atmosphere where students feel a sense of belonging because of the "user-friendly" lab. Partitions divide the multimedia computers into one-, two-, or three-person workstations. This offers privacy to students who have undeveloped keyboarding skills. Partitions also serve to muffle sound, minimizing disruption.

The computer video display terminals (VDT) and keyboards have been adjusted to be ergonomically comfortable. Students are able to work for longer periods of time with less eye, neck, and arm fatigue.

VDT's display text and graphics in a variety of colors. Students can adjust the color of the VDT to reduce vision strain (scotopic sensitivity syndrome). For example, some students prefer black text on a white background and some prefer black text on a blue-gray background. Students and faculty use the VDT color technology to facilitate instruction.

Tutoring is provided to support underprepared students taking classes in the CAVE and for a variety of classes on campus. As such, the whole campus benefits from the CAVE. Students gain beneficial skills in a friendly environment. Faculty refer

students who have great needs to the CAVE for tutoring and academic support. A significant portion of the CAVE tutoring is achieved using the computer technology.

The CAVE is open almost sixty hours a week to assist and support students working on papers and assignments. Students are always free to walk in and use the technology services.

Program Evaluation and Program Replication

The program at NCCC is evaluated quantitatively using attrition numbers and matriculation rates. Success in higher level classes will be measured, as part of an overall college assessment, for students taking classes in the CAVE. Measures of success will also be determined by comparing various input-environment-output variables from the years 1992-1993 and 1993-1994 (for underprepared students not experiencing the CAVE services) to 1994-1995 (for underprepared students experiencing CAVE services). The program is also evaluated qualitatively using feedback and suggestions from students and staff.

The CAVE program will be fairly straightforward to duplicate at other institutions. Once the necessary technology is purchased, the physical layout of the laboratory is easily reproduced. Curricula for NCCC classes can be quickly reproduced to meet the needs of other campuses. We feel strongly about the spirit the success of the CAVE.

Conclusion

NCCC has learned that it is not enough to simply offer technology to underprepared students. Technology must be supplemented with ongoing support and modifications to meet the needs of diverse learning styles and student needs. The physical layout of the learning environment in which technology is used has proven to be extremely important at NCCC. Offering an environment that is functionally attractive and comfortable sends a signal to students that they belong. One underprepared student remarked about the CAVE, "This is the best place on campus for students. If it wasn't for the CAVE I would not be making it."

There needs to be an integrated design for how community colleges use technology systematically and deliberately to support underprepared students as they work to achieve their goals. NCCC believes that by offering advanced technology, within a comprehensive student-centered environment, underprepared students can begin to experience personal and educational success.

Center for Personalized Instruction
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It has long been recognized in higher education that some form of remedial or developmental programs has been necessary. Through the years, increasingly larger numbers of academically underprepared students have been served in community

colleges. Since 1985, Florida's community colleges have had mandatory placement into "college-preparatory" courses in math, English, and reading. At many colleges, these courses are offered through the credit-level academic departments. At Palm Beach Community College however, the Center for Personalized Instruction (CPI), was established to serve "at-risk" students through a combination of traditional classroom instruction and individualized instruction.

The Palm Beach Community College CPI is unique in that it offers an integrated approach to delivering college and vocational preparatory programs, individualized study credit courses and supplementary support services. Palm Beach Community College's commitment is to co-mingle all segments of the curriculum in order to maximize available resources. Integrating "at-risk" students within the college structure enables them to interact with other students on an equal basis and contributes to developing a positive self concept.

Budgeted as a separate entity, the CPI is able to address the cross disciplinary needs of the college. Faculty and students are able to access state-of-the-art computer technology and software correlated with the curriculum. A comprehensive tutorial program is an integral component of all CPI offerings and focuses on retention of academically disadvantaged students. Recognizing the diverse needs of PBCC students, CPI offers individual study credit courses on a flexibly scheduled basis which allows students to arrange their classes around Job and family responsibilities.

Within this administrative framework the methods of delivering services to "at-risk" students vary on each of the four PBCC campuses. The following will give you an overview of the diversity of programs that have been developed by using technology to meet the needs of underprepared students.

On the Central Campus in Lake Worth, academically disadvantaged students enroll in courses that utilize a variety of innovative instructional methodologies. Lecture material is enhanced in individualized and prescriptive laboratory sessions. Students have access to computer software and interactive videos that supplement classroom instruction. In College Preparatory English, students learn word processing skills to assist them in the writing process. In Strategies for College Success, students complete a computerized learning styles inventory to identify their strengths and weaknesses. According to Eileen Holden, Division IV Chair the use of an electronic study skills inventory provides valuable information to faculty about the different learning styles of students. The results allow faculty to adjust their teaching style to accommodate a variety of learning and study styles.

Dr. Norman McLeod, Division II Chair, at the PBCC South Campus-Boca Raton expresses the basic philosophy of the CPI in stating that learning labs which include tutoring, computer-assisted instruction, audio/visual methods of instruction and other forms of individualized, personal instruction are most useful as supplements and/or alternatives to the traditional lecture-style classroom approach. In some ways reminiscent of the one-room schoolhouse, comprehensive learning centers provide the opportunity to diagnose and prescribe academic support to students throughout a wide range of courses, subjects, and skills.

The CPI Labs on the Eissey Campus, Palm Beach Gardens, directed by Joan Holcomb, Division II Chair, are equipped with networked computer systems and include Math, English and Computer Labs. Other resources include an interactive

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video machine audio tapes and filmstrips. Whenever possible the technological resources match the student textbooks. Computer assisted instruction is individualized through programs that provide pre- and post-test activities. On the Eissey Campus the CPI's Adaptive Testing and Learning Center is just beginning to develop technological resources. This new Campus support service provides support to the disabled student population. Besides access to computer-assisted resources, the Adaptive Testing and Learning Center has adaptive equipment such as a voice synthesizer, scanner and a computer program that speaks the words that are displayed on the computer monitor. This adaptive equipment provides independence for both the physically disabled student and the learning disabled.

The Glades Campus, Belle Glade, CPI lab, directed by Steve Scalabrin, also uses technology to supplement class lectures, do in-class assignments and allows students to work with computer based tutors in Prep English, Reading and Math classes while the instructor assists another student. Scheduling classes in the Belle Glade farm community is difficult, but with the use of computer technology, 23 directed - self paced courses have been developed. These courses are done via videotape, computer based tutor programs, detailed hands-on software lab manuals, a series of computer programs and dedicated lab assistants. Video materials can also be checked out and used at home to meet student scheduling needs. The lab is also set up so that a student with a computer and program software can call the lab for instruction. The Glades CPI also provides instruction via computer for the student who has a computer and no software, and for the student who cannot type. The student without software dials into the PBCC-Glades computer network and remotely controls one lab computer. For the student who cannot write, a voice control software system is available through Dragon Dictate (Windows version). This system serves the LD student or the student with physical limitations.

All campuses conduct studies to determine the success of the courses that it offers. The percentage of students who received passing grades in CPI Reading, English and Math are as follows:

	Reading	English	Math
1990-91	60%	59%	33%
1991-92	66%	63%	40%
1992-93	66%	46%	37%
1993-94	67%	62%	42%

The success these students achieve is not always discernible. Different measures have been used to determine the achievements of the students and the programs designed to serve them. By most standards, a 50% passing rate is considered excellent. Rates of 30% to 40% are not unusual. However it must be noted that other factors should be considered when evaluating success of students in developmental programs. Personal growth, satisfaction, enrichment, and self-esteem are not as simple to measure as pass-fail rates, but surely must account for the value added to the students' experience.

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The focus of this program is the effective use of technology with collaborative problem-based instructional methodology in learning situations for adults who attend adult basic education or English as a second language programs. Funded by a grant from the Illinois Community College Board, this non-traditional approach is in its second year of operation at the College of Lake County's (CLC) Center of Excellence in Adult Education. The purpose of this grant is threefold:

- Introduce technology into the adult education classroom
- Provide seamless education from literacy to college transfer or career programs
- Do research

In designing this program, the faculty and staff of the adult education department analyzed college entry criteria, current demographic and economic data, and local industry needs as a basis for selecting the most effective instructional strategy for students transitioning into college or entering the work force. Needs of industry were identified by research on entry level jobs done by the Lake County Private Industry Council in 1992 which clearly indicated that, in order to function well in the work place, people must be able to work in teams, solve problems, organize and analyze information, and use computers especially for spreadsheets, word processing, and database management.

On the basis of the above information, the faculty and staff selected collaborative problem-based instruction as the basis for their instructional methodology. The collaborative problem-based instruction begins with a real life "ill structured problem" that requires students to define the problem, set criteria, determine what is known, identify what must be researched, research, reevaluate, generate alternatives, select one solution and defined it. Using the two approaches together fosters students' self reliance, requires the use of higher level reasoning and communication skills, and promotes students assuming more responsibility for their own learning.

Because technology is important in both college and industry, it was decided to emphasize the use of computers as a tool for organizing and communicating information. Therefore, an integrated spreadsheet, database, and word processing program was preferred to a stand alone computer assisted instructional program. Students use the computer then to aid them in solving problems not as a mechanism for answering questions.

Overall, this strategy offers students the opportunity to be more actively involved in their own learning, communicate with others in the class, use computer technology to assist them in accomplishing a task, and apply what they have learned to relevant situations in their lives.

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As the project progressed, the faculty took responsibility for their own training and staff development. A committee identified computer training, information processing, problem solving, and group dynamics as topics for staff development. In seeking more information on problem-based learning, they found much of the work was directed at higher education and K-12 systems. Because virtually no research was available for adult education, many activities had to be adapted to the adult education classroom. The committee identified the need to create curriculum and materials. Once that was accomplished, those teachers implementing the curriculum have shared and observed each other's classes, reviewed strengths and weaknesses, then made suggestions for further refinement. Such improvements will be discussed during the presentation.

Experiences in the classroom have been positive. In class evaluations, students enthusiastically endorse their active involvement in solving a problem. Teachers have reported that the students apply their own expertise and experience to the problem, discuss issues with one another that they normally would not mention to the teacher in a lecture situation, and actively question the information given. Already, there is improved attendance which we believe is a direct result of building a community in the classroom. Teachers have noted that students initially have few strategies for accessing information, but during the course of instruction, they note that the students become increasingly self reliant. This appears not only to apply in the classroom but also, according to student anecdotes, to their personal lives. In redirecting learning from theory to application the students internalize the information which has resulted in better recall. Because the problem solving technique requires students to integrate technology, math, reading, and writing, the teachers notice improved transfer of learning from one subject area to another. For ABE and ESL students, language development is more natural. Oral and written communication develops from their own need to express themselves in order to solve a problem rather than from an externally driven text.

This program can be adapted to any community college adult education/remedial education program where teachers would have the opportunities for training and students could have access to computers which can use an integrated word processing, spreadsheet, and data base program.

Computer-Assisted Developmental Writing Instruction
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In Fall 1989, OKC Community College began utilizing 24 computers equipped with WordPerfect 5.1 as part of the curriculum in freshman composition, newswriting and the second semester of basic writing for underprepared students. In Spring 1990, the College offered its first CAI course in basic writing first semester, a course designed for developmental students who by assessment, are still functioning rhetorically at the sentence level.

A significant advantage that we have witnessed at OKC Community College in computer-assisted teaching of basic writing first semester is that when students with very limited writing skills are taught to write on a screen, their self-concepts are enhanced and the very act of composing and revising becomes less frustrating. It also appears that a positive bonding occurs among students who help one another with keyboarding and function key skills in an informal, less authoritative environment.

For the first four weeks at the beginning of every class, students write at least five sentences on a topic provided by the instructor. These efforts are not graded in the traditional sense; instead, the instructor moved from student to student, showing him or her how a word or idea here or a punctuation mark there can make a meaningful difference in content. Inevitably, there are students in the class who are familiar with the word processing program, and these become class assistants. Experience suggests that these "assistants" receive benefits from assisting their classmates that are far beyond what is expected in a beginning writing classroom.

The remainder of the class period is devoted to providing the students with rhetorical strategies and grammatical concepts to enhance their writing proficiency. A grammar program with text and exercises is available on the computer for group work. Halfway through the semester, students are encouraged to take class notes on the computer. "Take out a blank sheet of paper" is the cue that information is forthcoming on which students should take notes. The "blank sheet of paper," of course, is a blank screen.

In the fifth week of class, students begin submitting their "paragraphs" to the instructor to be graded. Halfway through the semester, all of the students have learned the rudiments of the word processing program: they can center and underline titles and double-space and spellcheck text. By the twelfth week, most students can easily move blocks of text from one part of the screen to another more appropriate placement. Revision is no longer a fate to be avoided at all costs.

No doubt about it, the first few weeks in a basic writing first semester computer assisted writing class are frustrating and headache-producing events that many instructors can live without. What prompts other instructors to return to this environment semester after semester is that they have seen the difference between the progress made by students who are taught in a more traditional format.

Computer-assisted writing for underprepared students is advantageous for many reasons. Eliminating rewriting by hand eliminates much of the stress and strain of revision. Spellcheckers and thesauruses encourage students to correct errors. The final product from the printer is legible and polished, giving students a sense of accomplishment and pride in their work.

The disadvantages to computer-assisted writing are few. Students who are unfamiliar with the software must spend valuable class time learning the program. Some of the software procedures, such as moving blocks, may be too complex. Lack of keyboarding skills can make computer-assisted writing more tedious than writing by hand. All of these disadvantages may be overcome through instructor screening of students to make sure they are ready for the computer-assisted classes.

Monitoring suggests that first semester developmental CAI students at OKC Community College, based on instructors' recommendations, are often able to bypass the second semester of basic writing, moving instead into a regular composition class. Those who do not acquire the skills necessary to bypass the next level of instruction almost always choose to enroll in a CAI second semester basic writing class. That decision of and by itself may be the best recommendation in support of this effort we have made at OKC Community College to combine pedagogy and technology for underprepared students.

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The Computer-Assisted Resource and Education Center (C.A.R.E. Center) at the Houston Community College - Southeast College provides a variety of instructional computing and support services in a "high-tech with human touch" environment. We have been able to integrate computer technologies into curricula that in turn use instructional strategies adapted to individual learners' needs and styles. Students are coming to our labs not just to learn with computers or about them, but to find one-on-one instruction, peer tutoring, and friendly assistance. Our unique and flexible open-lab policy provides students with services 79 hours a week on 135 IBM PS/2 computers in a token ring network spread among five connected rooms.

Every semester the C.A.R.E. Center serves 70% of our student population, with 70% of them in the developmental studies. Enthusiastic faculty pioneers put together various instructional models using computer- based delivery systems such as PLATO 2000 and a variety of multimedia CD-ROM courseware . In developmental English, Reading, Mathematics, Intensive English, and Study Skills, the activities (lessons, drills, tutorials, and tests) in the computer network are aligned with the course objectives, scope, and sequence. In these models, class time is appropriately divided between the computer lab and the traditional classroom.

The students may also take advantage of the flex entry courses in Developmental Mathematics, Developmental Reading, English Composition, History, Office Technology, and Computer Technology. These courses are designed with unique self-paced strategies, using computers and contact hours with the instructor. There is no lecture, but there is ample interaction with the computer and the instructor/teacher aids. In these models, students complete assignments and class work on their own schedule.

We offer constant remediation for the students that need to pass the Texas Academic Skill Program (TASP). During the summer we serve our neighborhood high school students with accelerated classes for the Texas Assessment of Academic Skills(TAAS) Tests which are required to obtain a high school diploma. The C.A.R.E. Center also serves other disciplines, such as Continuing Education, Vocational

Nursing, Drafting (AutoCad), Accounting, Government, Spanish, Biology, Chemistry, Physics, and Psychology.

Our busy information desk is usually the first stop for students with questions about: how to use the computer to type a paper, where can I find the English tutor, I need help with computerized accounting, I need to do a library CD-ROM search on..., can I get into PLATO to study for..., I need to check out the Government simulations, I need the CD for History, I am following what the book says but the graphic is not coming out..., I can't find the essay I saved on the disk..., or I can't get it to print. These scenarios are the daily routines for our team of lab aides, tutors, and instructors that literally walk students through steps needed to accomplish their work.

In the C.A.R.E. Center multidisciplinary instructional computer lab model we identify the following components: 1. leadership and staff 2. local Area network and technical support 3. courseware evaluation, adoption, implementation, and development 4. instructional support services 5. faculty training 6. instructional design, implementation, and evaluation of models 7. data collection

This integrated model has been proven to be cost effective and a key to improving students' retention, academic achievement, and promoting communication between faculty, students, and the community. It has been a challenge for our leadership, faculty, and support staff to plan, develop, schedule, manage, and adjust to the students' individual needs.

We have been collecting quantitative data to measure the use and frequency of our services. This information impacts decisions about the number of courses offered and the increasing demand for system resources.

There is information available about the academic success of students using instructional computing strategies as compared to traditional classroom instruction in the areas of developmental Mathematics and English. Data have been collected about TAAS results. We have conducted qualitative surveys for the use of computer-assisted instruction. Anecdotal testimonies have also been collected from our faculty who have witnessed the improvement in their student grades when they use the support services at the C A.R.E. Center.

The C.A.R.E. Center has served as a testing site for education software vendors, such as the TRO (PLATO), ACT (Compass test), and Enduring Vision Publishers (CD-ROM Series).

The near future will bring wide area network connection to the information highway. We are excited about the new horizon that our faculty and students will encounter using WAN services such as INTERNET, Pacer Forum, computerized library, e-mail services, and bulletin boards. The achievements of the C.A.R.E. Center go beyond computer lessons and testing, to fill a literacy gap that prepares under-served adults and at- risk inner city youngsters for the high tech future with a human touch.

Computer-Based Developmental Math & Writing Lab

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The fall of 1994 was an exciting time for El Centro College as we opened our INVEST computer lab, a twenty- station facility featuring an integrated learning system published by INVEST Learning Corporation and designed to develop reading, writing, and math skills. The college goal for this lab is to enhance the progress of developmental students by combining traditional classroom instruction with computer-aided instruction. Because we wanted the lab to be both visible and easily accessible, we housed it in our centrally located Learning Center where we also enjoy the bonus of a more casual and relaxed setting than that of a conventional classroom. College faculty use the Lab as a supplement to conventional instruction and activity; some hold one class per week in the Lab, while others conduct one or two lab orientation sessions and then require students to use the Lab outside of class; minimum participation is typically one hour per week. INVEST is adaptable to a variety of learning objectives, and at present, 23 classes (among them math, writing, reading, ESL, and college learning skills) and approximately 450 students use the facility.

The INVEST Lab is a great boon both to students and to faculty. Perhaps the greatest benefit to students is that the system requires them to engage the subject. Too many developmental students bring to their classrooms histories of indifferent academic success and old tapes of the education game: reading is often desultory (if done); assignments are tardily begun and readily abandoned; and participation becomes fervent prayer that they can get away with the above. CAI, however, compels students to invest themselves in their learning rather than allowing them to be passive receivers. The INVEST Lab also offers an additional focus for the course, creating a center at which both students and instructors meet outside of the classroom (most of our faculty volunteer at least one hour per week to help staff the Lab), and that serves to further integrate the course and learning into the college life of the student.

Yet another major advantage of the INVEST system is that it is a very patient and non-threatening tutor: a math instructor reports that one of her students, a very bright man in his middle forties, credited INVEST with his finally learning long division. Other students have also found that "missing link" in CAI which, unlike an instructor, operates under no time constraints, putting at ease that student who is capable but needs repeated instruction and practice to make some essential skill or principle his/her own. Students appreciate the immediate feedback INVEST provides as they complete lessons, and they are easily able to track their own progress and mastery. So too are faculty who with a couple of key strokes can access their students' learning histories including full information about mastery scores in lessons and the number of attempts and the clock time necessary to master those lessons. Faculty easily identify those who are doing very poorly or exceptionally well and then intervene in a timely fashion; that, of course, reduces frustration for all.

Also important for students is the collaborative learning which often takes place as students begin to teach each other: at one set of stations, a more experienced computer user assists a less experienced one, while at another set, one student patiently explains to another why that verb needs an "s" marker. And, finally, is the critical secondary benefit of helping our students become computer literate. Even those who begin by turning the mouse on its back and pointing it at the screen acquire the nonchalance of the veteran within a couple of weeks.

The Lab has also become a focus for collaboration among faculty, both adjuncts and full-time. The head of the classroom is too often a solitary place, but for INVEST faculty, that isolation has been broken as subject area specialists work together to craft appropriate material for their classes and as veteran INVEST faculty welcome new instructors to the CAI fold. Those veterans serve as mentors to colleagues as they learn the INVEST system and how that technology can be integrated into their courses. There is also communication among different disciplines as all faculty work together to solve problems and teach newcomers.

Finally, the INVEST lab has provided us with enormous opportunity for staff development. While some of our participating faculty were experienced computer users, many were adept only at word processing and e-mail, and none had ever used an integrated learning system to enhance instruction. An exciting element in our collective faculty experience has been growing awareness of the great potential of CAI in general and how we might integrate that potential both into our own classes and into the college's other educational enterprises (for example, distance and workplace learning projects). The Lab has become a wellspring of creative and exciting ideas for combining teaching and technology, and faculty have discarded some old tapes of their own: none of us would happily return to conventional classroom teaching.

In the future, we anticipate being able to address the developmental needs of students who are not enrolled in basic courses. Two faculty members are currently working with selected tech occ programs to identify language and math deficiencies which impede some students' progress through their certificate or degree plans. Those faculty will then develop self-paced review modules based on elements in the INVEST system and other programs available to us. We will provide tech occ faculty with module checklists which alert them to specific kinds of language and math problems we can address and which can also serve as referral slips for students. Clearly, our lab allows us to expand our definition of developmental studies and to serve a far wider audience than would otherwise be possible.

Developmental Education and Technology:
"Where Potential Becomes Reality"

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A growing and diversified student enrollment, an increased number of academically under prepared students and an overwhelming demand for sophisticated technological and occupational skills have created a need for instructors at Central Florida Community College to be not only creative but visionary in response to the challenges facing them. Traditional approaches are no longer the most effective approaches to meet complex needs of students. Instead, instructors must assist students through more divergent means to realize their potential.

Toward this effort, developmental mathematics, reading and English faculty have integrated the existing curriculum with the INVEST computer learning system. Faculty have used technology to address the multiple learning styles and to motivate the academic performance of under-prepared adult learners, while empowering them to pursue purposeful academic exploration. The goal is to provide a comprehensive system of quality instruction for developmental courses while encouraging a greater level of student autonomy.

Willbert McKeachie of University of Michigan identified the following factors that contribute significantly to the retention and learning of adult students: information is given in a visual and auditory mode, instructors talk with students, instructors have individual contact with students, opportunities for self-motivated learning are available and instructors give frequent positive feedback. In addition, research shows that 64% of those adult students who do not complete developmental courses drop out because of situational factors such as work, child care, family, and transportation. With this computer integrated curriculum, students are in a learner-controlled environment. The individualization of each learner's course of study is meaningful and efficient as the system maximizes the use of learner time by providing flexibility within the learning environment and allowing students to concentrate on productive activities.

With INVEST, learner placement is determined and appropriate assignments can be made, scored, monitored and adjusted automatically. The software program assesses the students' strengths and weaknesses in various areas and uses intelligent branching to accelerate the students' progress within the individualized prescriptions.

The total integration of the INVEST software into the curriculum provides students with an opportunity to focus on concept application and attainment. While lectures on techniques students should employ to improve their basic reading, writing and mathematics skills are essential, becoming skilled in all these areas is a matter of continuous practice, development and refinement. The lecture in these courses demonstrates a concept and is only a brief prerequisite to the more essential activities of concept application and attainment.

INVEST is designed to meet the unique needs of adult students by integrating relevant, adult content in all curriculum materials. All classes involved use the system for significant teaching and learning activities in ways that (1) improve communication and interaction between student and instructor, (2) provide meaningful and relevant information, and (3) improve student retention in these classes.

Faculty have committed time and effort to learn the software and to effectively implement it into the curriculum. The mathematics curriculum emphasizes guiding learners to develop problem-solving strategies in addition to building computational skills. Students are expected to apply their mathematical skills by deciding when to do what process. Another focus of the curriculum design is to alleviate math anxiety that many of the adult developmental students feel. The English curriculum is based on prewriting, drafting, revising, editing, and publishing. All suggested writing topics draw from the students' personal experiences and therefore require no outside research. The focus of the design is on successful communication, not on "right" or "wrong". The reading curriculum helps students become better readers and learners by developing basic vocabulary and comprehension skills. Words are introduced auditorily, thus providing independence for the learner. Repetition and integration, two key components of the reading curriculum, are a major part of the design.

The INVEST software also has an integrated Instructional Management System (IMS) that relieves faculty of clerical work, allowing more time for curriculum development, teaching and communicating with students and reflecting on the progress of each student. The IMS makes it possible to efficiently and effectively correlate objectives, competencies, off-line materials, and testing instruments. Faculty have access to the IMS and are able to generate a variety of student or class reports, tracked by learner performance, characteristics or demographics.

Student progress using computer-assisted instruction in developmental mathematics, reading, and English was measured by a controlled statistical analysis of learning outcomes using time on the INVEST software system as the independent variable. These analyses looked at a variety of dependent variables including course completion rates, grades, GPA, and posttest scores. Results indicate that total integration of the computer learning system INVEST into the developmental course curriculum has improved student performance.

Implementation of the INVEST program in the area of developmental studies will be an ongoing process. It is believed that faculty time, effort, and commitment are key ingredients to the successful integration of technology into the curriculum. Does technology make a difference for the under-prepared adult student? Adult students who have often faced numerous academic failures can now realize their potential as successful college students.

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The typical Dietetic Technician student at Owens Community College has not attended school during the ten years prior to their enrollment at our college. Among our Dietetic Technology graduates, 63% have taken at least one developmental course as part of their college coursework. The faculty of the Dietetic Technology Program noted students in the first nutrition course, of a series of five (5) related nutrition courses, are apprehensive and nervous about taking exams. The Dietetic students must obtain a minimum grade of 74% to remain in the technology. Even students who obtain exam scores of "C" and "B" are often heard to say, "If I knew how to prepare for exams, I could do better," or "What a stupid mistake I made, I know I can do better."

Three years ago the first semester nutrition instructor and technology chairman in consultation with the counseling staff decided to offer students the opportunity to retake each major exam during the first semester of the nutrition series of coursework.

The instructor prepared retake exams which are different form the original exam but comparable in content, format and difficulty. Each student regardless of her score on the original exam is given the opportunity to participate in the retake exams.

The decision to participate in the retake exams is a voluntary decision made by each student. The score obtained on the retake exam is the one used to calculate a student's course grade regardless of whether the score on the retake exam is above or below the original exam score.

The following chart summarizes the results for the three (3) years the Dietetic Technology Program has offered students an opportunity to retake exams:

	% of Students who Chose to Retake Exam	How Much Did the Retake Improve Students' Grades	Number of Students Who Would Not Have Passed Course Without Retake Exam
1992	64%	78% improved score Mean number of increase in points was 12.5	1 student
1993	55%	91% Improved Score Mean number of increase in points was 9.0	1 student
1994	61%	43% improved score Mean number of increase in points was 6	0 student

We have found several positive results from our decision to offer students the opportunity to retake exams in this entry-level nutrition course.

1. Students' grades in entry-level course have improved.

2. Students feel the retake testing is an excellent incentive to keep trying to do their best.

3. Students have passed the course who otherwise would have been dropped from the technology.

4. Students like having the option; because it takes away some of the stress of the exams.

5. Students feel the instructor is being fair and giving them every opportunity to be successful in the course.

6. The increased mastery of the subject matter by students in this entry-level course is helpful to students as they move into related nutrition coursework.

ENGLISH AS A SECOND LANGUAGE AND DEVELOPMENTAL READING PROGRAM
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Catonsville Community College (CCC) has a mandatory assessment/placement process which includes high school grades, ACT/SAT scores, and placement test results. The Computer-Adaptive Language Inventory, covering vocabulary, reading comprehension, and grammar skills is used for English As A Second Language (ESL) placement. The college will soon use the CD-ROM version of the CALI which will include a computer-adaptive listening comprehension test. A writing sample is also required and analytically scored by the ESL faculty. The reading "RDG" Placement test is the Placement Services, Reading Subtest.

The ESL program at CCC has grown over 1300% in the past four years. CCC currently serves approximately 175 students on the main campus and 350 students at an off-campus center each semester. Much of this increase can be directly attributed to program improvement resulting from the installation of two technology-based language laboratories. The program consists of four courses, each meeting six hours per week for a semester, which integrate listening, speaking, reading, and writing skills. The college also offers ESL labs for students wishing to study more intensely. On the main campus, the lab consists of a 24 station Tandberg audio/video lab and a 20 station, CD-ROM, MS DOS network.

The Tandberg lab allows faculty to download up to four audio tapes and one video tape simultaneously to any configuration of the 24 stations (Video may be shown on

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a large screen using a projector; however, the sound component may be heard and recorded through the individual student stations.). Once the audio is downloaded to the stations, students may practice their listening and speaking skills at their own pace. The system allows the students to record and monitor their own speech as they complete their Individualized Learning Plans (ILPs). Faculty may monitor individual student progress, interact with students, or record student work from the instructor's station located in the front of the lab.

The 20 station CD-ROM network used on the main campus is a true CD-ROM network (no CD-ROM drives are available at the student work stations). Skills Bank 3 and Reading Efficiency System software are used to provide basic grammar, vocabulary and reading comprehension practice. The Intechnica program allows students to further practice reading and writing as well as listening and speaking skills. Students may record their own digitized speech in the network. As students progress through their ILPs, faculty monitor both written and oral data through the network and make additional assignments as needed. Placement and exit tests are available for certification of students' listening, speaking, reading, and writing skills.

The off-campus center recently installed a 25 station, CD-ROM, Windows NT, network using the English Discoveries (an eleven, CD-ROM disk, individualized learning system (ILS)). Using Soundblaster Pro soundcards and Altec Lansing headphones, students may practice their listening, speaking, reading, and writing skills from the basic alphabet through advanced reading and word processing activities. The CD-ROM data and sound are not only available through the server tower, but also through a drive at each station. Students may record their speech in the network as they progress through their ILPs for faculty to monitor.

The college's Reading Across the Curriculum policy requires that all students be exempted from or successfully complete RDG 101, College Reading. Two levels of reading, RDG 091, Basic Reading, and RDG 101, are offered to prepare students for entry into General Education, with an approximate annual enrollment of 1,700 students. RDG 091 is designed for students reading between the seventh to ninth grade levels and covers basic comprehension (subject, main idea, details, and inferences) and vocabulary (word parts, reference, and context clues) skills. RDG 101 is for students reading between a ninth to an eleventh grade level and covers critical reading, information literacy, and textbook reading (SQ3R, Cornell, etc.) skills. The courses meet three hours per week for a semester. In order to successfully complete RDG 091, students must have a passing average in the course and score at or above the ninth grade level on a standardized reading exam. RDG 101 students must have a passing average and score at or above the eleventh grade level on a standardized reading exam.

At the beginning of the semester, students are administered a standardized reading exam and the results are used to place students in the appropriate computer programs in the lab. In addition to the class, RDG 091 students have two lab hours and RDG 101 students have one lab hour per week. The lab consists of a 50 station, MS DOS computer network using the Reading Efficiency System software. Faculty may access all student data from their office computers and make changes to ILPs as needed. This data may also be cross-referenced with mainframe data (grades, enrollment history, assessment data, etc.). Faculty also have BITNET and INTERNET through the network.

Studies conducted by the department following the installation of the lab found that lab attendance and work completed in the lab (time on task) rose sharply (Prior to the installation, RDG labs used commercially-produced kits.). Student satisfaction with the RDG labs, as measured by surveys, was also significantly higher. Most importantly, student success in RDG courses rose over 10% in the first year.

The ESL and Developmental Reading programs at CCC are designed to allow the college to 1) maintain an open door admission policy, 2) maintain high standards in college courses, and 3) offer students support to build the skills necessary to meet these high standards. Because ESL and reading courses are skills-based and require individualized practice, it is through the use of this technology that CCC is able to live up to the program's motto - "Taking you from where you are to where you want to be!"

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A project to design and operate an English Language Resource Center to support the needs of the international Limited English Proficiency (LEP) student population was implemented by the College faculty during the 1993/94 academic year. The focus of this project was to integrate the elements of multimedia computer technology, specialized peer tutoring, traditional learning materials, and faculty mentoring in a single location in order to provide English language skills development for the underprepared student. The target population included 1,000 students enrolled in the pre-academic American Language Program, and 1,200 matriculated students who identified English as their second language. A specific effort was made to support the language learning needs of those students enrolled in AAS career programs at the College. Funding for the Project included both grant and institutional support.

As part of the Project's design, a needs assessment was conducted to: Review the results of previous Institutional projects in the areas of ESL, Tutoring, and Computer Assisted Instruction; Include the College-wide community through the formation of a Project Advisory Committee; Solicit LEP student input for the design and operation of the center. It was clear that faculty and students felt that there was an immediate need for a specialized area that would address all of the language skills (listening, speaking, reading, and writing) of the international student population.

The technological component of the Resource Center was designed to promote and stimulate specific language learning activities. The computer hardware includes eleven multi- media stations with multiple sets of earphones and microphones to permit group interaction among the students and tutors. A closed caption transcriber permits students to access a printed transcript of video and TV materials into word processing programs to practice listening, writing, and reading skills.

Color digital scanning, a digital camera, and voice recording allow students to incorporate their original materials and ideas into self-produced computer presentations. The software selected for the Center includes programs that maximize the potential of the available technology, including CD-ROM based motion video, graphics, and sound. The programs represent a mix of those that are specifically designed to address listening and speaking by the recording and play back of student responses, while others are directed at reading and writing.

After one full year of operation, the Center has provided language learning support to over six hundred international students at the College. The impact of the Project was evaluated by the Directors of Academic Computing, English Composition, English Basic Skills, Tutoring, and Library / Learning Resources, as well as participating students. The data indicates that the Center has provided a positive support mechanism for international students in pre- academic English language studies, and for international students enrolled in career academic programs. The following factors contributed to the success of this project: 1. The project was designed and implemented by teaching faculty and involved the college-wide community. 2. The Center combined the resources of technology, tutors, and teachers in one place to provide services to a specific student population. 3. The teachers and tutors were trained to utilize the technology, and technical support was included in the design of the project. 4. Students were encouraged to include computer assisted language learning as part of their overall college experience.

Enhance Academic Success and Persistence Rates for Unprepared and Special Population Students

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One of the primary missions of the community college is to open the door to higher educational opportunities for students who lack the academic preparation necessary to succeed in college coursework. North Harris College recognizes this mission and is continually seeking more effective means of reaching and assisting these underprepared students. Serving this particular student population calls for techniques and approaches which might differ from those of the traditional college classroom, leading to a rethinking of curriculum, a diversification of instructional delivery, and an adaptation of instructional expertise and technique. In adapting community college instruction to best suit the needs of underprepared students, technological advances play a vital role. Specifically, computers and computer software provide exciting opportunities for augmenting instruction, for delivering instruction in new ways and for changing the instructional environment altogether. Over the last two years, North Harris College has developed and begun implementation of a strategic, college-wide program designed to technologically enhance both academic and occupational instruction with the specific objective of ensuring the success and persistence of underprepared students.

This college-wide initiative includes various components: faculty development, curriculum development, and the expansion and diversification of instructional

delivery. Faculty teams have been established within several of the college's instructional programs, including such academic programs as math and writing, and such occupational/technical programs as office administration, drafting, computer science, and electronics. These teams work to develop their own expertise in regard to both the development of computer-assisted instructional materials and the incorporation of computer-enhanced instruction in their own classrooms. Part of the work that the faculty teams accomplish is the development of curriculum. Each team defines pertinent curricular needs within its own program area and identifies technology-based methods and materials that would enhance the success rates of underprepared students in their classes. With the aid of an instructional designer and a workplace literacy specialist, both of whose efforts are focused solely upon this initiative, the faculty teams learn to write and program computer-assisted instructional materials and to develop their own instructional skills in teaching in a technologically-enhanced environment.

These faculty teams, with participants changing each semester, are scheduled to continue for the next three years. So far, more than fifty faculty members have participated, and within the next few years, the college anticipates that roughly three-quarters of the faculty in the designated programs will have gone through the development program. During that time, a minimum of fifty computer-assisted instructional modules will have been developed and made available for both classroom and supplementary student use. The modules which have been developed thus far include ones on Editing Strategies, Locating Information in General References, and Words for Work in Office Administration, among several others. All of these modules are designed to help students master prerequisite skills needed for college coursework and/or to enhance student performance in college-level work through a diversified system of instructional delivery.

Since implementation of any curricular or instructional changes developed by the faculty teams is obviously dependent upon computer resources, the college has set as a priority the establishment of various computer-assisted learning facilities. A central core of fifty computer stations has been designated within the college's Learning Center as an open lab for individual student use. In addition, serving the writing program are two computer-equipped classrooms designed for use by an entire class, with each student in the class having access to his or her own computer station. The college plans to provide two more such classrooms for use within the writing program over the next few years. The math program so far has been provided with a computer-equipped teaching theater, and another such theater will be added to the program next year. For use by students in the occupational/technical programs, an Applied Learning Center has been established in which fifteen computer stations are available for individual student use; within the next three years, this facility will be enlarged to house forty-five computer stations.

Implementation of the various components of the instructional technology initiative is taking place according to a planned timeline with clear objectives. A specified number of class sections each semester incorporate some level of computer-enhanced instruction. By the end of the initiative's five-year span, 50% of the class sections within the writing program will be computer-enhanced, and all of the occupational/technical students identified as underprepared will have access to computer-assisted preparatory instruction for their chosen field. Evaluation of the initiative' s effectiveness will then be judged on the basis of the persistence and success rates of the students benefiting from the computer-enhanced instruction.

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An additional component of the instructional technology initiative is the expansion and diversification of assessment services. The initiative calls for the establishment of a computer-equipped Assessment Center, in which students will be provided access to academic placement and diagnostic testing, occupational interest and aptitude testing, and various other types of assessment. A major focus of the center will be the provision of appropriate testing accommodations for students with disabilities. Not only does computerized assessment offer benefits in precision and accuracy of test results, but it also greatly increases access to a variety of assessment instruments due to the reduction of personnel involvement in test administration. For underprepared students, these enhanced assessment services are especially beneficial because of the increased accuracy of placement into developmental coursework and the availability of guidance instruments to assist in the planning of educational and occupational goals.

Several key components of the plan contribute to its success. First, all the activities are dependent upon faculty involvement; faculty are the ones who determine how their instruction will adapt to the computer-enhanced environment. Second, the initiative is not isolated within a particular program, but rather attempts to bring about strategic change college-wide, involving multiple programs at once, both academic and occupational/technical. Third, the initiative attempts to strike a balance between computer and human resources. That is, there is more to establishing a technologically-enhanced instructional environment than merely buying computers.

Guided Studies
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Many years of research, experimentation, and evolution have led to Central Carolina Community College's present, non-traditional approach to developmental education. Realizing that twelve prior years of traditional classroom instruction had not worked well for the students required to take developmental education courses, CCCC felt that a "thirteenth year" of traditional instruction was not the best approach. As a result, all developmental math, reading, and English courses are offered on an individualized basis in a self-paced, competency and mastery-based, computerized lab. Students must demonstrate mastery on every section of the courses. Technology is utilized in several different ways to assist the student in mastering the course material and to reduce the increased instructor work load associated with individualization and mastery-based learning.

Students attend classes on a regular quarterly basis, at specific assigned times. They are led through an in-depth orientation process to ensure they can use each of the lab resources with confidence. Attendance is checked and motivational and informational comments are directed to the class as a whole. Once the orientation process has been completed, students begin working on an individualized basis within the class. In addition to their regular class periods, students may attend

other classes to speed up their progression through the courses. As soon as they complete one course in a sequence, they are allowed to begin the next course. Individualization allows the course to begin at the student's current skill level. Often, underprepared students must "learn how to learn" before they can begin advancing at a steady rate.

Instruction is provided by means of video tapes and interactive computer software programs (in addition to textbooks). The video tapes are both commercially-prepared and instructor-prepared. Because students learn at different rates, the video tapes provide many advantages over traditional lectures. Students progress through the material at a pace that is comfortable for them. They have total control over the rate at which new information is being presented. They can pause the tapes to take notes or stop the viewing process to ask for additional explanations from the lab instructor/facilitator. They can rewind and replay the tapes as often as necessary to clearly understand the material.
Interactive tutorials are an integral part of the developmental education program at Central Carolina Community College. The interactive component ensures that students are actively participating in the learning process. Computer software is selected to ensure that students do not advance to new concepts until they have mastered the current concept. Frequent mastery checks are a key component of the programs. The software monitors the students' responses and takes corrective action as required. Often the students are re-routed through the material, given additional information, referred to additional resources, asked leading questions, or advised to seek assistance. The computer software does not replace the instructor in the individualized classroom. The software simply allows all of the students to work on different tasks at different rates with constant monitoring and immediate feedback.

Several different courses in the same discipline can be offered in the lab at the same time slot. Scheduling becomes much more convenient for the student. And the software frees up the instructor/facilitator to give focused one-on-one attention. Students become independent learners; they become more responsible for their own learning. In addition to gaining specific skills in English, math, and reading, the students become familiar with computers and various software packages in a non-threatening environment. All of the software is selected for its "user-friendly" qualities.

The developmental education math staff has developed a computerized mastery quiz program which administers all mastery quizzes in the basic math courses. The program provides immediate scoring and feedback for the students. A score of 90% is required to demonstrate proficiency. Because the computer is so exacting, attention to detail has improved greatly since the days when only paper and pencil quizzes were given. Students no longer quibble over the need for correct spelling. The computerized mastery quizzes have also increased the students' ability to follow directions. Quiz anxiety has lessened and the design of the quizzes leads the students to strive for excellence. Many students with learning disabilities have indicated a definite preference for the computer quizzes.

The developmental education English staff requires that all students complete writing assignments using popular word processing software. This software, along with all of the tutorial software used in the regular lab (math, English, and reading), is provided in a connecting lab which is available to students on a daily basis from 8 AM to 8 PM. All work in the connecting lab is completed under the watchful eye of a

lab coordinator whose background includes both tutorial and data processing expertise.

The developmental education staff has also developed its own computerized record keeping system to track student progress and calculate course grades. Weekly grade sheets are posted (by student number) which detail the students' progress, remaining assignments, current course average, and grade. Students are aware of their exact standing in the courses at all times. For the past several years, Central Carolina Community College has tracked its developmental completers. As each new aspect of the current program was introduced, success rates in follow-up curriculum courses increased steadily.

In 1994, the North Carolina State Board of Community Colleges approved an allocation of $102,000 from its 1994 - 1995 Reserve Fund to support a Developmental Education Project (Developmental Studies Program Concentrations) in the areas of basic math, algebra, reading, and English. Central Carolina Community College was selected to coordinate this exciting new project. CCCC will serve as the resource college for the remaining fifty-seven community colleges in North Carolina that offer developmental education courses.

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For many underprepared students, an emphasis on individual instructional needs is critical to their success within the classroom as well as outside of it. Because there can be such a disparity in the kinds of needs within a classroom, however, an individual instructor is often unable to provide the diversity of instruction a student should have. The Guided Studies English Program (GSEP) at the Wilmington Campus of Delaware Technical and Community College is assisting these students by using processes such as assessment and placement, collaborative classroom instruction, bibliographic instruction, writing coaching, portfolio evaluation, student services counseling, and the use of multimedia technology. Such processes constitute a specialized approach to the mastering of academic skills and the critical and confident use of computer literacy and communication skills which include reading, writing, speaking, listening and critical viewing of visual text. Opportunities for independent study for students encountering factors that affect participation in classroom learning are available once problem solving skills have been deployed.

In addition to the processes through which the GSEP program are introduced and implemented into a student's course of study are the Learning Assistance Center (LAC) and its three tiers concept. The program is designed to assist students in moving away from skill deficiency toward an educational potential through computers and software, learning style identification and self-directed learning. The flexibility of computers and associated software utilized by the LAC program allows students:

- to tailor their instruction to focus on skills contained in their individualized plan of instruction (IPI);
- to target skill retention by employing a variety of methods that accommodate individual learning styles.

The entire process begins with the assessment/placement diagnostic test, which charts competencies that have not yet been mastered. The results of this test become the student's and instructor's guide to the skill areas that need to be addressed. Software programs such as the "Computer Curriculum Corporation's (CCC) Success Maker", Conduit's SEEN Reading Program, and supporting vendor software are used by in the LAC.

The first tier of remediation contains hundreds of hours of instruction and includes many topics and skill levels. The primary purpose for such software are two-fold:

- to monitor student achievement that will either move students forward as quickly as their scores indicate, or will remain in place to remediate with tutorials and practices when low scores warrant;
- to integrate flexibility into their classroom structure by using the reports generated from the software
- to divide students into small collaborative groups which alternate between the classroom and the Learning Assistance Center.

Students visit the LAC and move as quickly, or as slowly, as they choose on whatever modules the initial assessment assigned. Therefore, the instructional boundary is not limited to an instructor and four hours per week of class time. Instead, instruction may occur during the four hours plus an unspecified number of hours of the students' own time spent in their self-directed learning.

The second tier of remediation in "Learning and Study Strategy Inventory" (LASSI). LASSI allows individual choice of lessons and methods that correspond to the student's special learning needs. The goals of LASSI follow:

- to provide students with a graph of their learning/study traits in ten critical areas which include Motivation, Time Management, Anxiety Level, and Test Preparation Skills;1
- to assist students in recognizing their ability to be successful; and
- to enhance and enrich their inherent study skill strategies.

The third tier is self-directed learning bridged by computer assisted instruction. Realizing that adult learning rests on individual interest and initiatives, students are encouraged to take control of their own academic initiatives and fashion their own goals and abilities using a variety of approaches:

- a multimedia approach to instruction that links graphics, audio, text and visual to individual learning styles;
- writing prompts and bibliographic formatting;
- access to information beyond the walls of the classroom through the use of internet accessibility.

For those preferring a human touch, writing coaches identify concerns, prescribe courses of action, reinforce strategies and evaluate options.

The result of all this is a comprehensive learning profile to be used by the student, the classroom instructor, the LAC Specialist, counselors and the Guided Studies English Program liaison. Management Program Reports support the instructional cycle, and planning, retention and marketing studies.

IPI Developmental Studies Program
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In the Learning Center here at Oklahoma State University in Oklahoma City we offer a variety of services to underprepared students which rely heavily on technology. One such program which is in its infancy is our IPI Developmental Studies Program. In this program students who have received mandatory placement in a developmental (pre-college) course and whose schedules prohibit them from attending a regularly scheduled class, can take one or more IPI (individualized paced instruction) courses in the Learning Center. At present the Learning Center offers two of these courses in each of the following academic areas: math, writing, and reading.

If a student signs up for an IPI course in writing, he or she must attend an orientation meeting the first week of class. During this time, the student and faculty go over the syllabus (which is a department-wide publication) and the course outline which is specific to the IPI class. All students in IPI courses cover the same material that students enrolled in the same class elsewhere on campus would cover; the difference is that class meeting (though held bi-weekly) are not mandatory, and the student is expected to do much of the work on a computer. Students are also given more leniency as to when course work is due. For instance, a regular developmental writing course might have three exercises and a writing assignment due each week, but an IPI developmental writing course might have nothing due until the third week of class, but the quantity of work would be greater than the equivalence of three weeks of homework in a regular class.

The computer assignments in an IPI course have been specifically designed to correlate with the material in the department syllabus. At OSU-OKC we rely heavily on INVEST software and find that it is easily adaptable to this application. Before the course begins, the faculty member can go into the INVEST software and design a program which follows the course syllabus. This program can then be named to correspond with the class (i.e. Developmental Writing), and then all students enrolled in the course are assigned the program. The INVEST system can be programmed to allow a student three chances to gain mastery of a certain concept. If the student is unable to gain mastery, the system "locks out" that student, and he or she cannot progress further. This management capability has proven invaluable to faculty because otherwise a student could simply continue working on the computer

until the program was memorized. When the student is locked out, he or she is forced to contact the professor, and the professor can make sure that the student gets the help he or she needs before progressing to the next level. In this way, the student is encouraged to learn the concept and not just memorize the answers.

We have tried to safeguard against misuses of the IPI courses by requiring that the students take all unit exams and a comprehensive final in the Learning Center. We were aware that students might be tempted to have someone else do their coursework, since none of it has to be done "in class", but this requirement, plus the fact that the exams are heavily weighted, encourages students to do their own work.

This system works for us because our student body is non-traditional (average age is 30; most students have full or part-time jobs). Those students who have sporadic work schedules can still take an IPI course because there is no requirement to meet regularly. Another reason for our success in this area is that the Learning Center setting promotes optimum flexibility. The Learning Center is open sixty hours a week, and although each faculty member is not required to be there all sixty hours, there is always at least one faculty member on duty who can help the student with assignments, exams, etc. Students are also able to access their folders in the Learning Center. The students put all off-line work to be evaluated in the folder and the teacher grades and returns it to the same folder. The teacher can also use the folder to advise the students on their computer progress and pass any other relevant information to their students. In addition, the Learning Center is responsible for providing tutoring for the entire campus, so if an IPI Student cannot get individual help from their professor of record, they can always work with a qualified tutor on their assignments.

We are still evaluating and improving this new program, but our early results indicate that students in IPI courses experience the same success ratio as those in the traditionally taught developmental courses on campus. Our goal is for our IPI students to be even more successful than their traditional counterparts.

Learning Center
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The Learning Center at HCC is an example of how technology and personal assistance can be combined throughout the academic career of underprepared students to help ensure success, beginning with academic assessment at the start of the student's career, academic support and guidance during their studies, and assessment and statistical analysis at the end of the program to measure effectiveness and identify needs.

First, all students entering the college are tested for academic preparedness in basic skill areas by the Learning Center. Students demonstrating deficiencies in any area are advised by specially identified and trained advisors who assist them in mapping

an academic program that will meet the curricular demands of the institution at the same time that it remediates the areas of underpreparedness. Statistical records are maintained to track the progress of students in the program. Once students remediate deficiencies, regular academic advisors ensure completion of the curriculum.

The second phase of the program works with students while they are enrolled at the college. During this phase, the Learning Center offers a unique combination of technological and personal support to these underprepared students and any others who choose to avail themselves of our services. Because centers that provide services strictly for underprepared students can hold a stigma for students, we make a point of supporting all different kinds of students in as many different subjects as possible.

With this in mind, the college offers a two-fold approach to remediating underprepared students. First, we offer course work in basic writing skills, reading improvement, college study strategies, and math skills development from pre-algebra to intermediate algebra. Second, through the Learning Center we provide professional staff tutors, working both one-on-one and in small groups, in basic and advanced writing skills, computer skills, basic and advanced math and algebra, calculus, physics, and chemistry. A number of our regular faculty at HCC also volunteer so that we also provide faculty assistance in the areas of accounting, psychology, anatomy and physiology, biology, philosophy, ethics, sociology, and any mathematics course offered at the college. Additionally, student peer tutors are trained and employed to tutor in basic skills areas. We also assist students in setting up group study sessions so that they can learn from each other. Students utilizing these services register when they arrive and leave to identify demographics of student use and areas of need administratively.

All of this personal support is augmented by a sizeable collection of interactive tutorial software and CD-Rom materials for both students and faculty. These materials are frequently assigned by faculty to support the regular academic program and to encourage diverse student use of the Center. Additionally, we maintain state-of-the-art computers and current software used in the academic program of the college. The Center also serves as a video viewing area and provides calculators and mini-tape recorders to any student who requests them. Records are kept on use of computers and technological support materials.

Statistical analyses are performed on a regular basis to ascertain the effectiveness of the program, retention of underprepared students, and comparative performance of underprepared students with other students, relative to Learning Center use and non-use.

Research indicates that we serve as much as twenty percent of the on-campus students DAILY. Furthermore, students identified as deficient in one or more areas by the entering academic assessment who use the Center perform as well or better as students not so identified. More important, they complete their programs of study at as high a rate as other students despite being identified as being "high risk" students, that is, students who are highly unlikely to complete their academic course of study.

Beginning this year, we will begin testing students at the end of their sophomore year using an instrument that correlates to the entering assessment. Using this test, we will be able to compare student performance relative to entering scores and use of special academic support programs.

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A Macintosh Orientation to The Southwestern College Library

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Southwestern College, like many of its sister institutions throughout California, has experienced a shortfall of available funds for instructional innovation as well as an increase of students who have not been properly prepared for the rigors of college level academics. We currently have an enrollment over 15,000. Many of these students begin a program of study unfamiliar with doing research, or even negotiating the college library. The attrition rate of such students is extremely high. To attempt to retain more of our traditionally under-represented students, something had to be done. It was determined by librarians and faculty alike that a thorough working knowledge of the college library is a positive aid to student retention. To help in the familiarization of the library to students who are not well versed, Bill Alexander, Dean of Instructional Resources, Tim Alexander, now a graduate student in Library Science at the University of Missouri, and Ron Vess, Bibliographic Instruction Librarian, are developing two projects: one a classroom enhancement and the other an interactive Macintosh program meant to be very user friendly. We hope to catch at-risk students, even those who may not know they are in need.

The Southwestern College Library maintains an aggressive Bibliographic Instruction program which serves the instructional divisions well. We are currently preparing and delivering in excess of 300 one-hour group orientation sessions per year. Even with this success we are not catching all those who are in need of instruction. Large numbers of students for whatever reason cannot, or do not, attend these sessions. In addition to the one-hour presentations, a one unit 9-week course is offered, but still all those in need are not addressed. It was decided to develop a library orientation module for a standalone "kiosk." Our interactive system will be available whenever the library is open and is designed to give elemental information on most aspects of the library's operation. We found several models currently in use at other colleges. But, they proved to be either too elementary or they are rigid in their presentation not allowing exploration or quick module change.

The project began by photographing over a hundred areas of the library. One hundred photographs were then digitally encoded by Kodak onto a PhotoCD. A PhotoCD player and a television now operate as an "electronic slide projector" to enhance orientations given in the library classroom. The images were then imported to the Macintosh so that an application, MacroMedia Director, could add text, animations and QuickTime movies to create an interactive program. The project has been developed over 28 months, has grown to 11 megabytes on disk, and will be installed for student use by March 1, 1995. A Fund for Instructional Improvement grant from the California Community College Chancellor's Office supports our project.

Math Process Oriented Learning
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Quinebaug Valley Community Technical College mathematics faculty recently piloted a new approach to developmental mathematics learning that emphasizes the learning process itself plus team work and computers. The course is based on the premises that we learn through experience, that learning is most effective when a problem needs to be solved, and that employers seek individuals who excel as quick learners, critical thinkers, communicators, self starters, team players, and professionals knowledgeable in their field.

Learner Profile

Learners reside in Northeastern Connecticut, a rural area that historically possesses both the state's highest unemployment rate and the lowest per capita income. Learners in developmental mathematics typically score 17 or lower on the New Jersey Basic Skills Test, are 80% to 85% female, and range in age from 18 through 65. The sample size was 37.

Horizontal Learning

In centuries old instructional methods, courses are taught "vertically" from teacher down to students in a lecture format where "horizontal," interactive, collaborative, learning is minimized. In the vertical format, students do exercises for homework, generally working alone; then the students return to class and sit quietly through another lecture. Unfortunately for everyone, this cycle ends the first day on the job where team work and communication are essential to success. This pilot course is designed to be 180 different, where the "vertical" mode of learning is minimized and the "horizontal" mode of learning is maximized.

Workforce Training

According to the American Society for Training and Development, American College Testing, and the Commission on the Skills of the American Workforce, the skills most needed by the American work force are knowing how to learn, reading, writing, computing, communication, team work, problem solving, self-motivation, and leadership. These skills are exactly those addressed by this Quinebaug Valley pilot course in which the immediate outcomes are increased math, problem solving, team work, communication, and learning to learn skills.

A Typical Day

Learners solve math, computer programming, communication, and learning-how-to-learn problems in teams of four. The captain is the leader who organizes the work effort, speaks for the group, and insures optimal performance. The technologist is the do-er who operates the computer. (No one else touches the machine!) The recorder is the scribe who writes the activity journal; and the reflector is the challenger who provides alternative perspectives on team performance, critical thinking skills, organization, communication, effort, and all else. These

responsibilities rotate among team members each class. Teams solve problems and answer critical thinking questions for approximately 20-25 minutes. Then all teams as a large group discuss those critical thinking questions unanswered or developed by individual teams. If a question cannot be answered by anyone, the faculty member becomes a "just-in-time" consultant and answers the question. Learners then practice math skills on computers in pairs to reduce math and techno-anxiety and to enhance communication and experiential learning.

Feedback

For personal reflection, feedback, and improvement of writing skills, learners write informal letters of approximately one page to address items such as topic interests, beneficial or frustrating events or circumstances, and desires for future learning. The letters are an arena in which to share ideas, resolve problems, answer questions, and clarify issues. Facilitators give supportive feedback to the learners, emphasizing the advantages of their new math skills, the self- empowerment derived from their self-directed learning, and the improved communication and team work skills. Learners report increased confidence, less math anxiety, and a genuine enjoyment of the subject matter.

Measures of Success

To begin discovering the value of using the "process oriented learning" approach to the teaching of developmental arithmetic, two faculty members prepared and taught for a semester one day and one evening section using the new methodology. Online computers generated the course tests and final exams. Criteria for skipping the normal sequel course, "Developmental Algebra," and entering directly into college algebra were the same as those used by other colleges around the country.

Forty-one percent of the learners from these two classes effectively doubled their learning rate, skipped "Developmental Algebra," and saved a semester of non-credit course work.

Future research could include a longitudinal study of these and non-pilot course students regarding success rates in math and other courses and persistence in the degree seeking process.

Program Adaptability

Other college faculty members could easily adapt this method to their subject area and learner population. Learners need neither previous computer knowledge nor special study skills preparation; however, faculty would benefit from prior training. Computer and text requirements are minimal. Other Quinebaug Valley Community Technical College faculty are already adapting various elements of the method to liberal arts and social science courses.

Modified Competency-Based Developmental Higher Algebra
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Worthington Community College offers a Modified Competency-Based teaching model for the courses of Higher Algebra I and Higher Algebra II. Both are non-transferrable developmental mathematics courses. The goal is to address student learning styles by encouraging the use of a variety of learning resources and by encouraging the formation of student study groups. Alternative testing opportunities, scheduled tutor assistants, computer aided software, small group study sessions, and a technology portfolio project are some of the variations used.

The five credit mathematics course meets daily for fifty minutes but in addition, students are expected to attend a fifty minute math session each week. The daily class time is used in a variety of ways as individual students choose a center based activity such as the testing area, a small group study area, working individually with a tutor, computer aided activities in the computer center, or the instructor- led lecture-paced discussion group.

These modifications provide a student with responsible choices or alternatives while self-determining how he or she best learns algebra.

Students are required to attend one math session per week which earns credit towards the overall quarterly grade. The math sessions are beneficial to students by providing a schedule, location, access to tutors, assisting students in the formation of study groups, access to specialized software and computers, and by assisting to relieve math anxiety.

Within a reasonable time and when a student feels competent to take a chapter test, a blue registration card is filled out. The card must be signed by the instructor and then serves as a pass to receive the chapter test. The blue card may contain notes for test taking, is used to post the test score for immediate feedback to the student, and becomes a resource to study when preparing for the final test. A comprehensive final is given where the results of the final test may raise the student's quarterly earned grade but will not lower the student's quarterly earned grade.

Video tapes and computer tutorials correlated to the textbook are viewed in the Library or are used in the Computer Center. The mathematics classroom, the math session room, the Library and the Computer Center are all within the same building. This close proximity to resource locations provides students with easier access to resources while learning algebra.

Historically the student testing results decline significantly when tested in a traditional manner over the topic of graphing linear equations and inequalities. In order to meet the goal of this teaching model that is, to address student learning styles by encouraging the use of a variety of learning resources, a student is required to complete a computer based discovery learning module. A Technology Portfolio component is required as an extension to the textbook during the

presentation of graphing linear equations and inequalities. The student writes, using fill description sentences, summaries and opinions about findings related to several investigated properties relating to linear graphing. The technology portfolio is designed to provide an alterative way for students to better determine self competency prior to the chapter testing.

Course evaluation surveys are collected at the end of each quarter. The surveys have provided information that led to the inclusion of the technology portfolio as a valued course modification. The surveys also provide a means for student feedback. The most common favorable comment is that students like the personal choices available to them when self-determining how they might best learn algebra. Another survey comment relates to time; students realize that they spend more time successfully working on algebra in a variety of settings.

The instructor serves a twofold capacity. As a facilitator, the instructor oversees and facilitates the smooth operation of the many center based activities which are on-going throughout the day. As a lecturer, the instructor prepares and presents the more traditional daily lecture and demonstration of solving several token problems within the classroom setting.

Modular Remedial Math
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The remedial math program at Bergen Community College is designed to promote mastery learning as well as to allow students to actively participate in the learning process. Math Workshops I (arithmetic) and II (algebra) are divided into 5 modules each. Students progress through the five modules at their own pace, as the instructors assess the students' needs through a variety of devices such as homework, journals, classwork, drill sheets, computer software, and pretests. Through these various techniques the instructors are able to prescribe specific work in areas where the students have shown a need for reinforcement of skills.

A student works on a module until he/she has demonstrated mastery, and only progresses to the next module when he/she has achieved at least 70% score on the module test. Instructors only allow a student to take the module test if they are convinced that the student has learned the material contained in the module. Instructors will determine a student's readiness for a module test by using a broad array of assessment devices, as previously described.

The program provides for a mini-math lab in every class section to deliver many of the support functions so important to facilitating success in remedial mathematics. The instructor teaches the different level lessons through mini-lectures and demonstrations, and then the students work in small mixed-ability learning groups in which they help, challenge, and check each other. These groups provide a friendly

structure that address a variety of needs and are a source of support and encouragement for the student.

Students are allowed to hold on to their partial success in the event that they do not complete the course in one semester and they need to re-register to complete the course. During the next registration in the course the student must complete the remaining modules and not the entire course. This information is passed on to the next instructor using a computerized system.

Math Workshops I and II are scheduled in two, three, or four parallel sections in nearby rooms. This allows for voluntary team teaching and flexible grouping among these identically scheduled sections. Although the student has registered for a particular section, it is with the understanding that he/she may actually be taught by any member of the team that teaches at the same time.

A computerized test bank generates all module tests so as to insure uniformity in student evaluation through a standardized testing procedure. Module tests consist of twenty questions that parallel the problems in the textbook, and are designed to be completed in 50-55 minutes. Each question is worth 5 points, and partial credit can be given for solutions that are not completely correct.

Students are required to retake a module test for which they have not achieved a minimum grade of 70%. They may elect to retake the current module test, even if they have passed, in an effort to obtain a higher grade. However, the score on the latest retest will stand even if it is a lower grade than a test previously taken in the same module exam. Once a test is taken for any module, a student is not allowed to retake any test from a previous module.

Instructors schedule 5 test days in class during the course for students to take module tests. This allows the possibility for 5 module tests to be taken in class. In addition a testing center is available to assist with test and retests. Students may take a test at the testing center with written permission from the instructor on a special form. Students bring the permission form to the testing center, during scheduled hours, to make an appointment for the test. A unique exam is computer generated for each student taking the test in the testing center. A computer generated key is also provided to the instructor for grading purposes.

A student who does not complete the course is given the continuation grade of M and is required to register and pay for the course again. The number of modules the student has completed and the average score on these modules is passed by computer on to the next instructor, so that the student is able to complete the remaining modules. A grade of M in a modular course may be repeated twice, if necessary, to complete the course.

Multi-Media Accelerated Math Assistance Program
Mississippi County Community College
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Assessment of both traditional and non-traditional students at Mississippi County Community College, following the guidelines established by the Arkansas Department of Higher Education, has channeled a large number of students into mathematics remediation. Many of these students track into three semesters of mathematics before they reach the course required for transfer, College Algebra. The majority of these students must struggle with the discipline at every level, and repetition of courses is a common occurrence.

In an effort to provide support for these underprepared students, the Learning Assistance Center has established a technologically advanced system to assist students both inside and outside the classroom. Components of the system include audio and video supplements and an interactive multimedia computer lab utilizing tutorial programs on standard computer disks and on laser disks.

Audio and video tapes form one segment of the system. Tapes which parallel the textbooks are available both for instructors' use in class and students' use outside of class. These tapes allow the student to repeat lessons until the concepts have been mastered. They also may be stopped and started as needed, encouraging the student to practice the concepts as they are presented. Additional audio and video tapes provide assistance in the math concepts as well as in areas such as test taking, note taking, and math anxiety. In addition to individual use by students, these tapes are often used to illustrate concepts and trigger discussion in tutoring sessions between students and their peer tutors.

The heart of the mathematics assistance program is a computer lab which utilizes interactive multimedia programs on laser disc to allow the student to move at his or her own rate of speed while progressing from basic math skills through intermediate algebra. The computer lab is user friendly, with students often needing very little help from the staff to work with the programs.

Each module of the interactive computer program includes teaching portions and practice problems and is presented in a situation which more nearly resembles a television production than a classroom setting. At the beginning of each module, the student is tested to determine the level at which he or she should begin. Students may work through parts of the module as review or they may go directly to the segment indicated by the pre-test. As with the audio and video tapes, the student may stop and start the program and repeat units as he or she finds it necessary. At the end of the module, the student takes a post-test which allows him or her to determine whether to progress or to back up and review. No pressure is exerted on the student to progress if he or she does not feel ready to do so. The programs also include practical application segments which provide practice for students in applied math and math classes for health and business as well as those in the remedial track. These practical segments connect the mathematics theories to

everyday applications and help to overcome the widely-held idea that "math has nothing to do with my life."

The equipment and materials necessary for this program are standard and can be purchased by any institution. Maintenance of the multimedia equipment should be done by a person with computer experience, but all other administration maintenance and operation can be done by any willing member of the staff.

Student success through this program may be measured in several ways. The computer program includes an administration package which enables staff members to monitor time on task and progress being made by the student. College data track students as they go through each remedial mathematics course and into College Algebra. Learning Assistance Center staff members are in constant contact with students using this program and receive immediate feed-back from the students regarding their experiences with all components of the system.
The mathematics assistance program has received positive reactions from students. It has given the students the feeling that they are more in control of their own progress. Having several methods of assistance has enabled the program to reach each student with the method which is most beneficial to him or her. Even those students with no technological experience learn to use the system quickly, and these students often exhibit great satisfaction with their ability to work with something that had very recently scared them with its complexity. The measures of success that the staff is most pleased to see are the feelings of accomplishment and increased self-confidence that the students demonstrate when they succeed, both with the technology and with the mathematics.

Open-Entry/Open-Exit On-Line Internet Course
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In 1993 Phoenix College identified a need to establish an on-line, self-paced INTERNET course with no prerequisites. The Basic INTERNET course utilizes an established delivery format which accommodates both full-time and part-time students at times when it is convenient for the student.

Target Population

This course was established with a delivery system that meets the needs of a variety of students through: 1) No prerequisites required other than knowledge of how to use a personal computer, 2) Scheduling--the availability of material on-line and available 24 hours per day, 7 days per week, 3) Having faculty available for assistance on-line and available 24 hours per day/7 days per week, and 4) The ability to access the computer from home, work, or school, since all that is required is access to a personal computer, modem, and telephone lines.

The target population includes entry level students, local businesses, re-entry students, and professionals who need to utilize their skills as well as learn to communicate around the world. These students also include all demographic groups who have both general and specific learning requirements.

Measures of Success

Over 80 students are currently enrolled in the open-entry/open-exit on-line INTERNET class and represent a very wide range of demographics They represent entry level students to retired professionals who want to continue to learn these new skills while obtaining information and communication skills around the world
The true measure of success lies in 1) The skills identified by local and national businesses as those that are looked upon most favorably for employment, 2) Having the students initiate an evaluation process that critiques the course content, delivery system of material, and the faculty support that is available, 3) The enhancement of the student's problem-solving skills as they access and utilize the tools available on the INTERNET, and 4) The ability to transfer these skills learned to other college courses as indicated by student communications.

Creativity & Innovation

This program has effectively been molded into and molded into a part of the offering of the open-entry/open-exit computer laboratory. This allows the program to take advantage of the availability (79 hours/week) of the facility, as well as having personal assistance from the assigned faculty, lab techs, and student aides during these hours.

Since the course is on-line, it is also available 24 hours a day/7 days a week without the student being in the computer lab.

With the need for students to juggle their time between family, school, work, and social activities, the availability of this program is proving itself to be not only a valuable asset to the student community but also opening this discipline to students who might normally not have a chance to participate. The community libraries are providing limited INTERNET connection through AZTEC Freenet for those that can use that facility and allows equal opportunities to all who can partake of the time.

The ability to provide this self-paced material grants the student the ability to complete this course in at least a two- to three-week period. This assumes that the student documents all material and assignments. The course also provides students with the ability to monitor and track their progress through computer access of their grades at any time. The students find this most helpful, both as an inspiration and motivation in working with the class.

A major innovation in this course of study is the ability to have continuous on-line access to an instructor for questions, consulting, and other course-related items. This allows for one-on-one questions that can be answered on a timely basis, in writing, truly eliminating confusion and misunderstanding.

Since all the communication access is through an e-mail interface, there is no limit to participation for anyone who takes the course. The course, therefore, cannot discriminate in any form based on race, color, creed, physical attributes, or social skills.

An added by-product of the program is the realization of the "telecommuting" concept. By taking advantage of the ability to participate in the class from anywhere, we are encouraging students to work from their homes or places of employment, thereby not only helping to improve the access methods but also to help clear our air by eliminating the need to travel to school. This course is a practical use of the telecommute concept.

Conclusion

In adapting W. Edward's Deming's Theory to this Course, we have created conditions under which learning is not obstructed. We have removed the structural barriers to learning and provided the resources and situations under which their creativity, problem solving and quest of information is enhanced.

> Improve constantly and forever the system of production and service, to improve quality and productivity and thus constantly decrease costs.
>
> --W. Edwards Deming

Pre-Employment Program for Persons with Disabilities
El Centro College
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The goal of the Vocational Rehabilitation Department at El Centro College (ECC) is to train students to obtain full-time employment in high demand jobs in the Dallas-Fort Worth Metroplex.

The Texas Rehabilitation Commission (TRC) conducts vocational and psychological evaluations and then refers clients (students) to the program. Students may have experienced physical or psychological trauma during birth or occupation, from substance or spousal abuse, or as crime victims. Their economic, age, gender, environmental, ethnic and educational backgrounds are diverse. But, to a person, they need training or re-training to enter the workforce.

Using the Vocational Education Model and with the cooperation of the public and private sectors of the Metroplex, we were able to identify current and continuing jobs for which we should train our students. These jobs are general office, clerk, data entry, customer service, secretary/receptionist and hotel front desk.

After identifying and sequencing the required cognitive, psychomotor and domain (Bloom) entry-level skills, we articulate these skills throughout our Mathematics for Specific Occupations, Workplace Literacy (reading, writing), Keyboarding, Data Entry, Intro to PC, Wordprocessing, Lotus and Office Systems (office machines, organizational behavior and conflict management) courses. Finally, "programs" (curricula) were identified to achieve the required skills for each job. It is interesting, but not surprising to note, that all of these jobs require some degree of computer hardware/software skills.

As students enter our Pre-employment Program (PREP), they participate in an orientation to the program. During the orientation, they are individually interviewed, and our Vocational Counselor and the student decide on the appropriate job and program for the student. Flexibility in program choice is available, because all of the programs have transferable skills. Lastly, a written Job Plan (curriculum plan) is signed by the student, vocational counselor and TRC counselor.

Since the passage of the Americans with Disabilities Act has awakened our sincere interest in students with disabilities, educators have examined employment opportunity skills, courses, curricula, teaching methodology, learning environment and materials best suited to the teaching of these special students. In many cases, adaptive equipment or accessibility to classrooms and labs is all that is necessary to integrate students with disabilities into traditional education. But, some students need adaptive teaching methodology.

Interactive learning grew from computer-assisted-instruction (CAI) and has been incorporated into many college curricula. However, students with disabilities, overlooked by some in education, have had their basic and advanced education enhanced by using interactive learning, specifically, Jostens Learning Invest computer software.

Many students with learning disabilities, especially, attention deficit disorder (ADD) students, which "...we used to call. . . 'hyperactivity' . . . " (Kate S. Brooks, Dickinson College, Carlisle, PA), have demonstrated positive learning results when an interactive, CAI methodology is implemented. This seems to be because Invest, interactive software breaks tasks into smaller steps.

The process we use at ECC to influence positive learning results has its focus in individualized and self-paced interactive methodology. Because we feel that interactive, computer methodology is an adjunct to CAI, we have an instructor managing the class and providing support to the student.

The following is an overview of student initiation, practice and mastery of subject content, using Invest's interactive, computer-assisted methodology.

I. Review Lessons - Insofar as most students are not familiar with the Invest software, each student completes a series of short lessons, using the various types of tutorial instructions, practice questions and tests contained in the software. The review also acquaints or refreshes the student-user's manipulative skills with the computer hardware.

II. Placement Tests - The student completes subject pretest(s). The Invest software will place the student in the appropriate lessons (skills), which the student demonstrated a need for learning.

III. Strands and Lessons - Before the student undertakes this part of the Invest learning process, the instructor reviews with the student the placement test(s) results. During this conference, the instructor identifies and validates with the student the areas of strength and weakness demonstrated by the student, i.e., strength in whole numbers, addition and multiplication, however, weakness in fractions, decimals and proportions.

The instructor also uses the management functions of the Invest software to explain to the student the interactive learning process the student will undertake. At this time, it is important for the student to understand that the learning experience will be self-paced and individualized, since we all do not learn all subjects at the same rate of speed. The student is assured that instructor help is available when needed in addition to the tutorial exercises in each lesson.

IV. Subject Content Mastery - Most strands (topics) will begin with a pretest. If the student achieves 80% competency, the student does not have to complete the various lessons in that strand. If, during the various lessons, the student achieves three (3) consecutive mastery grades (90%), then the student will proceed directly to the strand's posttest. Posttests are mastered with 80% competency.

It usually takes students from four (4) to six (6) months to complete and successfully master the coursework in their Job Plan. During that time, they complete a job search process through the College's Placement Office.

Students have obtained jobs in the public and private sectors. Most have entry-level jobs with technology, financial and service companies. Some have become employed by educational institutions and city, state, and federal agencies.

Our program has proven to be the launching pad for some of our students to enter higher education, enrolling in degree programs at ECC and other colleges. Having seen the remarkable student progress, the Invest interactive learning process has been adopted by the Mathematics, Communication and Developmental Studies Division at ECC and by other colleges in the Dallas County Community College District.

Radiography Technology Program
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Students entering radiography and radiation therapy programs generally have strong academic preparation. They are eager to begin the life science courses, but are apprehensive with the great amount of mathematics and physics topics contained in their technical courses.

Several years ago, the department was awarded funds for curriculum development through the Ohio Board of Regents. Macintosh computers were purchased and several members of the faculty began developing materials which could strengthen the skills and knowledge base of our students and enhance the chance of their success. These programs range from basic repetitive drills of mathematic skills to exercises requiring decision making skills.

Most of the programs are animated, and have color and sound. They were developed to be interesting and hopefully fun for the student (as well as educational). Each program has a tracking system so we are able to determine the level of mastery that each student obtains.

In the two years that the programs have been available, we have required that all students use the programs, and reach a minimal score of 85% on each unit. We have obtained feedback from the students through anonymous surveys and discussions. Most of the student feedback has been very positive and they appear to appreciate the extra resource available to help them reach their educational goal.

R-WISE
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R-WISE encourages students to practice composition in a computer-mediated environment, where the specially designed software acts as a procedural facilitator. This term is used by Vygotsky (1978) to explain the cognitive mentoring and developmental dynamics that occur between master and apprentice and between peers during collaboration. Many use the term to suggest that the computer can serve as a peripheral brain for the fledgling student and provide the scaffolding that allows the novice to practice the more robust problem-solving behaviors of an expert. R-WISE serves as a cognition facilitator for critical thinking by:

- Easing demands on short-term memory and helping to focus attention on strategically important aspects of writing;
- Guiding the inculcation and self-initiation of higher-order processes (metacognition) which the novice writer is unlikely to activate without prompting;
- Explicitly modeling strategic intellectual process so that the fledgling student avoids what has been termed "downsliding", or becoming increasingly entangled in lower and lower levels of mental actions, finally concentrating all mental energy on such things as spelling, grammar, and sentence construction to the exclusion of larger concerns in the process.

Several instruments to measure learning outcome are possible. Perhaps the best is the use of a writing sample. Two high schools in the same district and demographically similar were used. One as a "control" and one as a "test group". Two equivalent writing prompts were devised and one was given in January as a pre-test; the other was given in May as a post-test. Rubrics for holistically scoring the papers on a 1 to 6 scale were devised and approximately 2200 samples were professionally evaluated. The standard procedure of having two readers examine each paper was used. Inter-rater reliability was .79 -- meaning that, for close to 80% of the writing samples, a team of two readers gave the paper the same number

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during independent evaluation. This is a rigorous standard of reliability. The more common practice in writing sample scoring is to declare continuous numbers (e.g., 4 and 5 or 3 and 2) reported by two readers as being in agreement. Had we used this method of determining agreement, our inter- rater reliability would have approached .92.

The differences in means on the pre-test and post-test for both control and treatment groups were deemed statistically significant using t-tests showed that both test and control groups advanced in writing ability. An approximately 8% greater gain was shown in the test group when compared to the control group. At the time of the initial study, the software was in a "beta" version. A more finished version of R-WISE is now being used and tested and we hope to get even more of an effect from this production version of the software.

R-WISE has no content, not "lessons" or "materials" in it. The program is an "empty engine" which the teacher program using the author tool. She can insert whatever materials, lessons, writing assignments, or reading she feels are appropriate. This flexibility has enabled R-WISE to work effectively in classes from 9th grade remediation to first year college composition classes.

STEP, Student Transition into Educational Program
An Academic Support Program for Leaning Disabled Students
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Students with learning problems are a growing population in postsecondary education. Although most possess average or above intelligence, LD students frequently arrive underprepared for college. They require a wide variety of instructional and support strategies, many of which can be addressed using various technologies in conjunction with a combination of traditional teaching, group support, and individual tutoring. Vincennes University's STEP program is designed to give postsecondary LD students the opportunity to develop their own unique abilities and to achieve their highest academic potential. Students develop a sense of self worth and the skills needed to function and to learn independently in college. By developing their own capabilities and emphasizing their strengths, students are more successful as they make the transition from high school into college. Imperative to the students' success is the use and mastery of various kinds of technology.

A keyboarding/word processing class, HES 101, "Special Topics in Study Skills," was developed specifically for LD students placed in the required developmental writing class, HEW 009, "Fundamentals of Writing." Students complete the HES 101 with improved typing skills and trained in word processing. The students take this course "paired" with a special section of HEW 009, taught by the same professor and also using pc's. This paired arrangement provides daily reinforcement of both typing and writing skills and seems to enhance the students' chances of success. Through this technology-based "pair," the students are freed of the sometimes difficult task of

physically writing (often barely legible). Further this approach teaches the students to easily and quickly edit, find and correct spelling errors, produce papers which are easy for professors to read, and it also enable them to compete on a leveled playing field in later, college-level writing classes.

Essential to the improved academic performance and success of postsecondary LD students are self awareness, good study skills, and sophisticated social and technological skills. The cornerstone of VU's STEP program is a 2 credit, four semester sequence, "Coping In College I-VI," which addresses these skills. In addition, the sequence creates an on-going support group for STEP students and provides opportunities for interaction and group learning. Through the four semesters that they enroll in the "Coping" classes, the students develop academic proficiencies by engaging in increasingly sophisticated and complex levels of self awareness, social skills, and study skills. The classes are team taught in a workshop/seminar format and meet once a week, either in the late afternoon or evening. The curriculum is practical and emphasizes active thinking, independent learning, student accountability, and the acquisition of specific strategies proven to improve the academic performance of college students.

Each of the "Coping" classes has specific objectives. "Coping In College I" addresses self-advocacy, compensatory techniques, coping and adaptation, stress management, socialization, and other topics relevant to the beginning college student. Since spelling is frequently a problem, all students are given small electronic spellers which they are encouraged to use in all their classes. In addition, through in-class activities identified as STEP Strategies, students begin developing the organizational skills vital for their academic success. "Coping In College II" emphasizes socialization and metacognitive skills. Through group interaction students explore the areas of listening, conversation, asking questions, non-verbal communication, expressing feelings, respecting the feeling of others, self-control, assertiveness, criticism and change. Students also develop organizational and metacognitive skills using intensive computer programs in class. Areas covered include how to read a psychology textbook, how to read a biology textbook, summary writing, textbook marking, and test taking.

In "Coping In College III," third semester STEP students are appointed as mentors to first semester students. This requires them to hone their social skills and further solidify their study skills. Also, responsibility and accountability are shifted to the students as they assume more control of their academic lives. In-class activities concentrate on self-exploration. Finally, "Coping IV," a more individualized class, emphasizes career planning, job seeking skills, and social skills, and culminates in a class retreat.

The "Coping" classes have proven to be very beneficial to both the students and the university. The classes are income generating and have helped amortize the cost of the program. Because the classes are credit bearing and earn letter grades, students can more easily maintain full time status (essential to financial aid and dorm space) as they acquire/improve their basic skills and make the transition to college. In this transition phase, STEP students learn from and share the experiences of other college-oriented LD student through group interaction and self-exploration in the "Coping" classes. Topics and areas essential for the success of all LD students are broached in our collaborative class environment. Costly tutoring or one-on-one instruction are reserved for academic areas of student need: in STEP, each student is assigned and must meet weekly with a professional tutor. Peer tutoring, through

our Study Skills program, is abundantly available. Finally, the "Coping" class format not only legitimizes the program, but also holds both faculty and students accountable for outcomes.

Students are encouraged to use many different kinds of technologies which best suit their learning needs and style. All Step students have access to the only interactive computer assisted and integrated reading, writing, and math program on campus. Since it is both diagnostic as well as educational, students can target their specific areas of weakness and proceed at their own pace. Other diverse technologies which are commonly used by STEP students or made available through the university are variable speed tape recorders, cassette recorders, lap-top computers, books on tape, and videos.

After four years, university and faculty support of the STEP program has increased tremendously. College professors are learning to understand and appreciate both the hurdles and talents of LD students. LD students are learning to use their own unique abilities and available technologies to enhance their own success.

Technology for the Underprepared Student
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We have been using a number of innovative, technology-based strategies in the developmental mathematics program at the Borough of Manhattan Community College. These strategies include, but are not limited to:

- multimedia instruction in elementary algebra,
- on-line testing in arithmetic, and
- the use of graphing calculators in intermediate algebra and trigonometry

Most technological support for BMCC's developmental math program, which serves some 3,000 students a term, is housed in our Math Lab. The Lab has an annual budget in excess of $100,000, is directed by three college lab technicians and is staffed by some 30 tutors. The resources for computer-based learning in the Math Lab are extensive, and include 50 Macintosh computers, 25 Apple II computers, and several IBM PC's for both classes and for drop-in.

Multimedia Algebra

This semester, six sections of elementary algebra are being taught in a multimedia format. Based on courseware produced by Academic Systems, students assisted by a professor and a tutor self-pace through algebra topics in a computer environment that features sound, video, and animation in addition to text. This capability to individualize is particularly important in a developmental course in which students vary greatly in the extent to which they have learned pre-college material.

Working at stations equipped with CD-ROM drives as well as headphones, students can either work by themselves or with a classmate. The department has encouraged students to work together collaboratively, allowing questions posed by the system to generate lively student discussions of the mathematics.

Students have great flexibility in navigating through the system, and can take notes in a word processing journal an extremely popular feature.

The system has extensive diagnostic capabilities. At the beginning of each lesson, students may choose to take a pretest to see if they already know and should skip the lesson. At the end of each lesson, students print out a customized homework assignment in the accompanying text ("personal academic notebook") based on which questions they have answered correctly and which incorrectly. The system is very interactive, and has many creatively designed and interesting questions. A detailed student management system allows the instructor to easily keep tabs on everyone's progress. The aural reinforcement seems particularly promising for ESL students, who enjoy the combination of written and spoken presentation. And most students seem to be highly motivated working in this multimedia environment.

On-line Testing

BMCC faculty have created software that permits on-line testing in our developmental program. A basic math student ready to take a test say in percent sits at a microcomputer and is presented with a series of test items. Questions are randomly generated, ensuring the integrity of the assessment. The student having completed the exam can review his or her answers, make appropriate changes, and then is instantly graded by the machine--an important motivational consideration. Every problem is explained, and students going over an error can choose between various solution strategies. Students can call up problems similar to those which they got wrong to test their understanding of the explanation. In addition, they can print a question out for going over at home. In those classes where the instructor follows a mastery approach, the software permits the student to retake the exam after appropriate additional study.

Graphing Calculators

Graphing calculators have begun to create a revolution in college mathematics, as well as the developmental curriculum. Our program has available to it some 60 graphing calculators (TI-81's and 82's) as loaners to our students. The calculator's multi-line display is very useful to basic math students studying a topic such as order of operations, where both the question and the answer appear in the display.

But the graphing calculator really comes into its glory in an algebra and trigonometry course, where the graphing and tabular capability brings teaching to life. Students can enter linear functions say and painlessly explore how changing the parameters m and b in $y=mx+b$ affect the function's graph, providing an animated dimension to the concepts of slope and intercept. Students can readily see the difference between such functions as $y=x^2$ and $y=2^x$ in pictorial terms, and even solve a system of simultaneous equations such as $y=x^2$ and $y=2$. and they can explore such realistic applications of algebra as population growth and radiation decay early on in studying algebra.

The department provides training for full-time and adjunct instructors in the use of graphing calculators. Faculty then use the graphing calculators and report back on how to improve instruction in their developmental courses.

Measure of Success

The use of technology permeates BMSS's entire developmental program. Passing rates vary with course and across time, and have ranged widely, from 50% to 90%. However the actual passing rates are significantly higher, since many students pass in post-course intercession tutoring programs which are run each January and July. As for longitudinal data, an institutional research study carried out by the college concluded that students who are placed into a developmental math course and who pass the first time do just as well in later courses as students who had initially been exempted.

"Tech Prep -- Pathway to the Future"
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For several years representatives from business and industry have said to educators that America must develop and teach practical education that builds a first class society with the best competing workforce in the world. To meet the demands of the Workforce -2000, Bevill State Community College implemented "Tech Prep - Pathway to the Future." Through this program partnerships between five secondary schools, business, industry and Bevill State were formed.

This Tech Prep Program was initiated at Bevill State Community College, Hamilton Campus, in 1993 based on the need to serve high tech students better. With special legislation in 1976, the Hamilton Campus, at that time Northwest Alabama Technical College, was granted permission to serve as an Area Vocational High School program for Marion County School System. Through the years the need for a new beginning targeted toward recruitment of high tech students surfaced. The driving force behind this program is the commitment to prepare students for the future workforce.

Through this program, Bevill State recruits, employs, trains and sends teachers into five secondary schools located in Marion County. Students are administered pre and post tests prior to placement into Basic Skills, Job Readiness, Study Skills, Career Awareness, Computer Literacy, Technical Science, Technical Math and Technical English courses.

Practical uses and applications are emphasized in the classroom, going beyond abstract textbook theories and concepts. Students are involved in the teaching/learning process. Labs are a vital component of classroom instruction. Cooperative learning and team effort are focal points in the Tech Prep curriculum. Students are helped to understand the workplace and to make learning useful. Another aspect of this program is to provide on-campus technical training. For

example, the newly implemented Practical Nursing Program is a breakthrough and one of a kind. Upon completion of this Tech Prep Nursing Program, students have earned "banked" credit that is applicable to postsecondary training. Other programs offered for secondary students on the Hamilton campus are Air Conditioning and Refrigeration Technology, Automotive Technology, Aviation Maintenance Technology, Barbering/Cosmetology, Electronics Technology, Drafting Technology and Machine Tool Technology.

An important incentive in this program is advanced articulated credit. Students earn high school and college credit at the same time. Parents win with a shortened program for their child. Students win with advanced credit and high level skills. The college wins with better prepared students, and, business and industry wins with a better educated workforce. The transition from high school to postsecondary training is made easier with less duplication. Students are encouraged to stay in school and set goals for postsecondary training. "Life after high school" is illustrated through the Career Awareness course and activities.

With pre and post testing, student progress is documented throughout the course. This documentation is a valuable asset for future funding and program continuation. Student data collected illustrates that students plan to take higher level science and math courses in addition to graduation requirements. Moreover, students feel comfortable with math and science courses.

With much emphasis and questions focused on educational reform, at Bevill State the college concludes that this program is making a difference and having an impact on the lives of young people. Documentation shows that, through innovative processes, students are taking higher level science, math and computer courses. At Bevill State, we believe this program opens minds and opens doors to the future.

Use of Technology for Underprepared Students
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The last several years have seen an increase in the underprepared student in introductory chemistry courses. As a result, the failure and drop out rate in these courses began to rise. Most of the failures were attributable to inadequate mathematical skills, high anxiety and learning methods that did not respond to a traditional lecture format.

In order to address all three problems, we have established both an Interactive Video laboratory (IVL) and a Science Learning Center (SLC) where technology is used as a supplement to the classroom.

Both the centers are places where students use a multi-sensory approach to learning. In the SLC the students can use computer programs, video cassette programs, film strips, work sheets and drill books in all areas of their course. They

can study in small groups or take advantage of group tutoring. There is no one on one tutoring. The Center is set up specifically to let students use all, or as many methods of learning as possible, so that there will be at least one which will help them the most. Each student is provided with a list of all topics to be covered in the course by his/her lecture teacher. Next to each topic is a list of every type of technology that is available on that particular subject in the SLC. The IVL has a similar list for all the interactive videos on each topic in that center. When a student has trouble in any area, he is encouraged to go to either center and use the material available on that subject. In order to encourage students in general to use the supplementary material, the teachers also build assignments in the centers into the course.

Because the math skills are often very weak, we have instituted a series of modules which students in the introductory chemistry course must take as part of their grade. These modules review basic algebra and chemistry theory. They include such topics as ratios, scientific notation, metric system, stoichiometry and the mole. They must pass each module, and successful completion of all six is worth 10% of the course grade. They first take a pre-test in an area and can test out of a module. If they fail a pre-test, they use the various technologies to review the work and then take a re-test.

The establishment of both of these centers has enabled us to address what we feel are the three main causes of failure by the underprepared student. We review and update math skills by the module program; we reduce the anxiety level by letting students do these programs at their own pace and we enable them to find a learning style that best suits them.

The students themselves are extremely enthusiastic about the use of these technologies, particularly the use of interactive video. The department has seen an increase in the number of students taking and passing the introductory courses with a concomitant increase in the upper level courses as well. The number of students in the second year courses has doubled since the program was started. This is an easily adaptable program. It only requires that the use of the technologies of computers, video programs film strips and other technologies be made an integral part of the course. We use it to supplement the regular classroom, and it has been working extremely well.

WORKFORCE TRAINING CENTER
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In addition to assisting State Tech students in strengthening their basic skills, the Workforce Training Center also helps governmental and corporate groups to prepare to take the academic assessment test that will place them in college classes. To accomplish these goals, the Workforce Training Center offers a systematic computer-based structure of programs with a wide scope of learner levels combined

with a diversity of academic sequences. The system utilizes IBM PS/2 55 SX computers with IBM and third party courseware to provide instruction in basic reading, mathematics, and language arts with entry levels from third grade to G.E.D. proficiency. The beauty of computer-based instruction stems from the fact that it provides flexibility, immediate feedback, privacy, and self-paced learning for adults who have been away from the academic scene for some time. Center instructors are available to work with groups or individuals to facilitate learning and to monitor and evaluate progress.

Groups that enter the WTC are initially given the Test of Adult Basic Education (TABE) which provides a reliable grade level equivalency in reading, mathematics and language. Based on these scores an Individualized Prescriptive Program is written for each student which places the students in the appropriate programs, units and lessons for their needs. Students spend a stated period working in these instructional programs and then are post tested with the TABE again.

The amount of instructional time depends upon the nature of the group. The Center serves several different types of groups. Two groups identified in this report are the Job Training Partnership Act (JTPA) and Learning Can Be Fun; both of which are state or federally funded. Other groups include City of Memphis employees, drug offenders, displaced homemakers and community members who may attend once or twice weekly and spend four weeks to six months in the Center. Their post testing is occasioned by their move into classes or movement out of a program.

The foundational component of the Center's software is the WICAT system (World Institute of Computer Assisted Teaching) of reading, mathematics and language. The levels on the network system range from grade 3.0 to pre-GED in all three areas. Other more advanced commercial software is available, but the WICAT system is the most consistently used for basic skills instruction in the Workforce Training Center.

Pre/post testing scores show various results. Consistent gains of two to three years across the disciplines are usual. There are also occurrences of spectacular gains of four or five grade levels in a specific subject. This more than likely indicates the student had a solid background in that subject, but had not had an opportunity to use the rules and formulas for some time and had become "rusty" in that area. The computer program allowed the student to remember and reinforce that information in a short period of time. This sequence seems to particularly apply to students who pretest in mathematics at the 7.0 or 8.0 grade levels. It is not unusual for them to post test at 12.9 grade level. Students who pretest under a 5.0 grade level rarely gain more than one or two grade levels.

The students noted in Category One are students who scored 12.9 on their pretest of the TABE. The highest scoring level for the TABE is 12.9, so these students will show no gain on their posttest even though they may have progressed one or two grade levels during instructional time spent on the computers. Presently, there is no other instrument available to post test them that directly correlates to the Test of Adult Basic Education and that also gives a grade level equivalency over 12.9. Therefore, these students that pretest at a 12.9 grade level equivalency are subtracted from the total number of students and omitted from the data analysis of the pre/post test scores.

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Category Two identifies those students who pretested below 12.9, but who made no increase in grade level equivalency. In fact, they may have actually made a post test score lower than that of their pretest score. It is unlikely that a student "unlearned" material while working in computer based instruction, so absence of progress or actual gain loss must be due to other causes. There may be several explanations for this occurrence. First of all, a student may have made a strong score in one of the areas of reading, mathematics and language and a lower score in the other two areas. For this reason, the student may have focused time on task on the two areas which were weakest and not on the strong subject. In this case, the weaker areas would show significant gain scores while the strong area would show no gain. Secondly, there is the possibility that a student may simply have had a bad day during the post test or not felt well, consequently making a poor showing on the testing.

Category Three identifies the number of students who made academic progress on the computer based instructional system whether it was less than a grade level or whether it was as much as five grade levels. The majority of students made gain score progress of some kind in all three areas of reading, mathematics, and language. JTPA students' achievements in reading show that 70 of 107 or 65% made progress; in mathematics, 90 of 107 or 84% made progress and in language, 78 of 110 or 71% made progress. LCBF achievements were slightly higher. In reading, 23 of 26 or 88% made progress, 25 of 28 or 89% made progress in mathematics, and 25 of 27 or 92% in language. These slightly higher percentages may be due to the fact that the LCBF group has fewer participants or the participants are slightly younger.

Category Four provides percentage information on those who made gain of one year or more in the three areas of reading, mathematics and language. Once again, JTPA had percentages of 52% of students in reading, 62% of students in mathematics, and 60% of students in language reflecting academic progress of one year or more in the majority of students in this group working on the computer instructional system. LCBF percentages are again at least ten points greater than the JTPA.

Categories Five and Six give percentages of those gaining two years or more in grade level equivalency. Category Five identifies those students attaining two or more years in grade levels in the areas of reading, mathematics and language. The percentages for JTPA reading are half those attained for mathematics and language which still show gains approaching 50% for academic progress of two or more years of grade level. Reading progress relies less on the learning of rules and formulas than mathematics and language do; therefore, progress, especially at the higher levels such as 9.0 and beyond, shows slower academic gains. LCBF percentage gains in reading are greater in category five and six which may indicate that pre-test reading levels may be lower than those of JTPA.

Category Six identifies the percentage of students who attained progress of three or more years in grade level equivalency. An examination of the scores shows that this at times may actually be five or six grade levels. As discussed earlier, this more than likely indicates the student had a solid background in that subject, but had not had an opportunity to use the rules and formulas for some time and had become "rusty" in that area.

SECTION II

PROGRAM AWARD WINNERS

Student Research for Teaching Critical Thinking

Darton College
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Many students enrolling at Darton College are first-generation students from a predominantly rural Southwest Georgia. The region is characterized by a diminishing agricultural economy, substantial poverty, a high rate of public assistance, considerable unemployment, a high educational drop-out rate, and low student achievement scores in grades K-12. The area has a 44% minority population.

In the sciences, students who transfer to four-year institutions are expected to be able to critically analyze and solve a scientific problem through experimentation. Due to a variety of factors, most students who enroll in a college science curriculum at Darton College do not possess these skills. To improve student scientific reasoning skills, the Biology Department at Darton College requires all students enrolled in General Biology to participate in a student research project.

Each student uses a computerized work station connected to the Local Area Network (LAN) to assist with literature retrieval, data analysis, and scientific report writing. As a pre- and/or co-requisite for General Biology, all students are required to enroll in a Microcomputer Orientation course that trains students to use a word processing and spread sheet program. Each research project lasts approximately nine weeks. Instructors provide students with information regarding the project during lecture and laboratory.

During the course of the quarter, only one three-hour laboratory for setting up the experiment is dedicated specifically to the project. In order for students to complete their projects, they must organize their time to work on their projects after they finish their formal laboratory for the week or at a time when the laboratory is open. During the first quarter of General Biology, the research librarian and course instructor train students to retrieve scientific references using an on-line computer network, a CD-ROM computerized data base, and a scientific index. After students have been trained in literature retrieval, they are assigned a research problem and work in teams of two to assemble a bibliography. The bibliography is then submitted to the instructor on a floppy disk for review. The submission on floppy disk ensures that each team can use the word processing program on the LAN and reduces the amount of paper used for the project. After the instructor approves each bibliography, each team then collects appropriate references and uses the computerized work station in the biology laboratory to write their research proposal. Each proposal includes a statement of the problem, literature review, hypothesis, and a complete materials and methods section including method of data analysis. The proposal is then submitted to the instructor for editing. Edited papers are then

returned to each team of students for revision. Revised papers are then re-submitted to the instructor for evaluation. Students then set up and perform their experiment. After the completion of the experiment, each team must statistically analyze their experimental data using a statistical program on the LAN.

Prior to this analysis, students were trained through a formal biology laboratory on the use of a statistical program on the LAN to test a hypothesis. Each team then prepares a results and discussion section for their project. This section of the project is then submitted to the instructor for editing. Edited papers are then returned to each team of students for revision. Each team then assembles its entire research report for evaluation by the instructor.

During the second quarter, students utilize and build on the research skills they developed during the first quarter. Research projects for the second quarter require students to work individually on a problem that they select. At the end of this quarter, each student presents his/her project in the form of a poster session.

Student Created Computer Calculus Movies
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Borough of Manhattan Community College (BMCC) is a large urban community college located one-half mile north of the World Trade Center in New York City. The college's student body is eighty-five percent African-American and Latino and two-thirds female. Since women and minority students have traditionally been underrepresented in mathematics in the United States, faculty at BMCC have been active in developing successful alternative teaching and assessment strategies. We have particularly focused on students creating portfolios of calculus projects in order to increase their chances of successfully transferring to four-year colleges. We have been a leader of the Calculus reform movement. With support from the National Science Foundation, we have been successfully combining the use of technology (both computers and graphic calculators) with collaborative learning techniques. Having students create calculus movies is the latest and perhaps most exciting innovation in our program to-date.

Recently, Mathematics students working in collaborative groups have been producing mathematics movies or animation as part of their portfolios in Calculus II and III. New software packages, such as Macromind Director and Mathematica, allow students to animate a set of graphs to create moving images. This permits students to investigate the properties of functions and relations, to gain intuition about their nature and to demonstrate their dynamic properties.

A typical student project dealt with the Taylor series. The Taylor series approximation was shown by starting with the graphs of $y = e^x$ and $y = 1$ on the same axes. The next frame of the animation was $y = e^x$ and of $y = 1 + x$. The third frame contained $y = e^x$ and $y = 1 + x + x^2/2$, etc.

In the animation created when the frames were shown consecutively, the polynomial appeared to approach the transcendental function on the positive side of the x axis, as we increased the number of terms of the polynomial. An interesting effect, however, occurred at the negative side of the x axis. As the number of terms increased, the polynomial graph alternated above and below the x axis, appearing to be a wagging tail. For the alternating series Taylor approximation of sin(x), there are wagging tails on both the positive and negative sides of the x axis. In addition to creating this animation students were expected to describe and explain what they observed. Being actively involved in creating their own movies and then having to verbalize and write about their observations creates a powerful and dynamic learning environment. Explaining the differing effects observed in this movie gave the students creating these animations insight into series, probably not attainable as clearly or as easily any other way.

Another group of students chose to work on Weierstrass' function. Before computers, Weierstrass' function, the sum of a trigonometric series, could not be graphed by hand with any confidence beyond the first term. With function plotters, students can see how the graph of the series changes as the third, fourth and fifth terms are added and this had been done in class on a graphing calculator. What is extremely exciting for us is that students decided to follow up on this activity to see what would happen if they animated this iterative process on the computer. Macromind Director enabled them to turn the graphs of Weierstrass' function into an animated computer film by making the graph of the first term of the function the first frame of the film. The graph of the sum of the first two terms becomes the second frame of the film, etc. As the students showed, the filmed graph become increasingly more jagged. They inferred from the animation, in a very convincing and visual way, why the function is continuous but not differentiable at each point.

Five Manhattan Community College students presented their latest animated mathematical movies at a recent meeting of the Metropolitan Section of the Mathematics Association of America at York College, Jamaica, New York. They showed eight animations on topics including Taylor series, parametric equations, polar equations, convergent solutions to a differential equation, and Fermat's Last Theorem. While most animations highlighted calculus topics, the Fermat animation created by the students pointed out that the purported proof by the project leader, Dr. Lawrence Sher, of a minimum condition for Fermat's Last Theorem was incorrect. They then were able to find the algebraic error, reinforcing the interdependence of algebra and computer graphics in research. The students were awarded memberships in the Mathematics Association of America for their ambitious and well received presentations.

Our use of technology particularly this latest program of creating animations and our emphasis on group work and on writing to learn mathematics has changed radically how some of us teach. Lectures are shorter (and one hopes sweeter) to allow time for students to actively explore mathematics. Students are encouraged to explain, to find examples and counterexamples, to generalize, to analyze and to apply concepts to real world situations in a variety of subject areas.

These student projects allow alternative methods of assessment. They permit students to show their growth over a semester, their ability to analyze and synthesize (in a way that typical tests do not), and their ability to write in the language that is mathematics. We have statistical evidence of increased success and

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retention rates in class sections developing mathematical products such as animations. As exciting as the statistics, however, is our own experience of watching our students grow professionally. Several students have used portfolios of their calculus projects including animation projects to secure admission and in several instances scholarships to prestigious four-year colleges as transfer students. We believe this successful program is creative, innovative and easily adaptable by other colleges.

SECTION II ENTRIES

Alternative Energy Program
Crowder College
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Contact Person: Art Boyt

Crowder College is a small, state-supported, comprehensive community college located in the southwest corner of Missouri, serving 1,750 credit students. Through its noncredit and industrial training programs, an additional 5,000 students access the college's programs and services. Over the past three decades, in spite of a rather lean budget, the college has engaged in several creative projects and activities, including its efforts in the field of alternative energy.

After a series of innovative solar projects, including pioneering work with three solar vehicles, the college made the decision to formalize a curriculum in Alternative Energy. The resulting program of study offers students options in pre-engineering, science and technology for transfer to area colleges, including the University of Missouri at Rolla, Southwest Missouri State University, and Pittsburg State University. Because the alternative energy curriculum, with its unique and diverse applied research projects, is the only one of its kind in the state, the Missouri Legislature recently designated Crowder as the first Alternative Energy Technology Center for the state of Missouri.

Regarding the inception and development of the program, the college laid the groundwork when it designed and built the first solar vehicle to cross the United States using only solar energy. The vehicle, TSAR, now resides in the Henry Ford Museum. In 1987, Crowder's second solar car, STAR, raced in the first World Solar Challenge in Australia. Competing against vehicles costing up to 300 times Crowder's budget, STAR finished eighth, beating all of the Japanese and American teams, except the multi-million dollar General Motors Sunrayce.

In 1990 Crowder competed with a new solar car in the first GM Sunrayce across the United States. After placing 5th in the Sunrayce, ahead of MIT and other top twenty American engineering schools, STAR II went on to successfully compete in the Australian World Solar Challenge and the Japanese Grand Solar Challenge.

Student volunteers comprised the teams who built and raced the college's vehicles, yet there was no related program major they could pursue. Realizing that an Alternative Energy program would address this need, in 1991 the college sought and received approval from the state governing board to offer an associate degree transfer program in Alternative Energy.

The Alternative Energy program continues to conduct the hands-on, team-oriented energy projects for which it has become known. In 1994 a Crowder student team successfully raced its LAZER (Long range Advanced Zero-emission Racer) in a national electric vehicle event in Phoenix, Arizona. Through a collaborative effort with the Eagle Picher battery company, the team finished second in the event

against a field of corporate and university teams. The LAZER team will return to Phoenix again in March 1995 with a new experimental battery from Eagle Picher and a computerized data acquisition system, which should further improve the vehicle's performance. Later in the year, the LAZER team will also challenge the electric vehicle distance record of 350 miles on a single charge.

Another class project this year has involved collaboration with the Mono Equipment Company in Springfield, Missouri. Students in the program are in the process of converting a gas-powered riding mower to electric drive. Mono Equipment plans to examine the prototype mower developed at Crowder for possible production and marketing across the United States. Also active in a wide range of other energy projects, Alternative Energy students have designed and are installing a solar and wind system to provide renewable power for the building in which the program is housed. Students have also participated in organizing the Sunrayce competitions sponsored by General Motors. Other student activities through the energy program include involvement in the organization of workshops for public school teachers and life-cycle cost workshops for engineers and energy managers throughout the Midwest.

The applied energy research at Crowder involves extensive use of the latest technology, from the designing of the projects through computerized aided drafting to the computer analysis of test run data to acquiring background research through the Internet. Not only do the research activities hone the students' technology skills, they also have a broad impact on education, energy conservation and renewable energy options throughout Missouri and the rest of the Midwest.

It is evident to the college that the projects to date have afforded Crowder students opportunities that would be difficult, if not impossible, to access during their freshmen and sophomore years at other colleges and universities. In addition to the applied research activities, this program also offers its students several other very unique advantages, including 1) a classroom environment which fosters the development of team building and leadership skills; 2) interaction with managers and corporate executives from companies such as Eagle Picher and General Motors; and, 3) participation in activities which develop entrepreneurial skills and know-how.

The Crowder College Alternative Energy Program offers other community colleges throughout the country the blueprint for expanding and enhancing selected technology programs, especially through the incorporation of applied research into the curriculum. The end results include state-of-the-art instruction for students; a segue for the establishment of partner relationships with business and industry; the identification of untapped resources in terms of donated equipment and financial support; and, the potential for state, national and international recognition.

Associate Degree by Distance Education
Chemeketa Community College
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The college classroom at Chemeketa Community College in Salem, Oregon is taking on a new look. For some students it may be a kitchen table or a computer desk tucked in a bedroom corner. Beginning fall 1994, the college made it possible for students to earn an associate degree without ever stepping foot on campus. For non-traditional students who can't fit a typical college schedule into their lives, distance education is an innovative solution that makes up-to-date education affordable and accessible.

Chemeketa's program is designed with flexibility in mind for students of any age and life situation who have difficulty in attending classes at a set time and/or location. But the personal touch is what makes this program so effective for diverse populations. A counselor is designated to work with distance education students to plan their course of study; an 800-number eliminates long distance calls for students, making telephone assistance a feasibility; and customized packets of forms and information are mailed to prospective students to get them positively started on their career path. Recognizing the needs of life long learners, distance education college courses are transferrable to four-year institutions in the state to make a bachelor's degree available via distance education as well.

The distance education program is designated to eliminate barriers; to make the program truly a distant learning experience that will give students the opportunity to master information age technologies. The courses are designed to be a combination of self-directed and interactive learning experiences. With students and teachers both having more freedom to respond at their own convenience, students may find that their work actually gets more personal attention. They may also find themselves participating at a more active level than ever before. Students can critique one another's rough drafts of reports, participate in discussions, as well as ask for guidance with homework all through the computer. And some telecourses offer class discussion by phone or by computer modem.

Although Chemeketa is one of the first community colleges in the nation to offer associate degrees through distance education and the first Oregon community college, the beauty of the design lies in its ability to be replicated. Colleges that are willing to make a commitment to technology will find themselves enabling greater student success and graduation rates. Currently fifty to sixty courses are offered each quarter with approximately 3,400 students annually enrolled in some form of distance education at the college. Students may enroll in a combination of telecourses and courses via interactive television, mail and computer bulletin board and receive the following services:

Telecourses-Prerecorded telecourses are broadcast over public broadcasting and local cable stations in the college district. Videos are available to students for viewing at local sites or students have the option of renting the videos from a national video company.

Live Television-Classes are televised to college centers throughout the district; two of the classes are also available concurrently over local cable channels to students' homes or work sites. An example of this is the fire science class, designed for personnel working in the field, which is delivered over local cable to fire stations located in Chemeketa's district. Students outside of the district may view the class on videotapes. All faculty teaching on live television are mentored by a media specialist who serves as a resource in development and use of the technology.

Correspondence-These courses include work equivalent to that which is done in the classroom. Students send assignments to the instructor who returns them with individualized comments.

Computer Bulletin Board-These courses are designed for maximum communication, allowing students to participate in discussion groups. Assignments are also sent to the instructor via computer modem.

Pre-recorded Telecourse/Computer Bulletin Board-Students view pre-recorded telecourses and use the computer bulletin board for group discussion and assignments.

Through distance education, the college can offer a high quality curriculum, eliminate commuting time for students, and preserve limited building space while tailoring programs to the diverse needs of students. Whether students plan to reenter the work force, upgrade their skills, or fulfill a life-long dream of attaining a college degree, Chemeketa Community College has forged the future through applying technology to quality teaching and learning for the transfer student.

Biology 115, Self-Paced Lecture/Lab
Mountain View College
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C.E.O.: Monique Amerman
Contact Person: Larry Legg

Serendipity happens only if you're ready. And so it was not just a coincidence that Mountain View's Larry Legg was drawn to a session on an interactive biology course at a Virginia Tech conference just over two years ago. For Legg, who teaches Biology 115, this session was the catalyst that put him to work on an innovative instructional program that makes computer technology an integral component of the learning process for students in liberal arts biology.

In Legg's biology lab, the glow of computer terminals has replaced the flames of Bunsen burners, and non-science majors are discovering the value of real world science.

Computer components were incorporated into the curriculum as a part of every student's experience in the Spring 1994 semester. The result is a course that adds to lecture and lab components a variety of multimedia sources, including 2-D and 3-D graphics and computer animation, to help students visualize complex biological processes. This multi-sensory input, says Legg, is designed to accommodate

different learning styles. For example, an audio/ animation module covering photosynthesis and respiration is an illustrative demonstration that enables students to visualize via computer a process that they could only imagine before.

Another aspect of the program allows students to simulate experiments on the computer. Unlike traditional hands-on experiments, sophisticated programming enables students to retract and retry steps of the experiment without starting from the beginning.

The newest, and most exciting module added to the course, explains Legg, uses digitized, interactive photos to explain life and non-living cycles throughout the biosphere. With over 45 pictures ranging from mountain to urban environments, students are able to click on portions of the photos, the sky, trees, the soil - to discover how life cycles work.

Regardless of which of the modules students are using, each is designed to lead the student to explore the subject until he understands it completely. With the interactive programming, students are asked to respond to questions throughout the lesson. An incorrect answer given by the student indicates what portion of the lesson he may not be grasping. Based on the answer, the computer automatically reviews the appropriate portion of the lesson. "The animated portions have great appeal for the students. The students see the process of learning as fun."

According to Legg, he's had not only the information, but the desire to develop the multi-media components for over six years. "We've been waiting for the technology to catch up to our needs," said Legg. "We are now able to match our instructional ideas to appropriate technology - CD-ROMS, laser discs, video - to make the program work," said Legg.

Does this concentration on computer modules take away from the role of the instructor? Not according to Legg, who adamantly states that it allows him to concentrate further up Maslow's hierarchy serving as a mentor rather than a giver of information. "People who think computers will put teachers out of business haven't tried this system yet," says Legg. "In my experience, teachers have to work harder than ever. As students begin thinking critically, they ask more questions, and most of them don't come with easy answers."

Legg is excited about the process which he feels vitalizes students. "This is real teaching," says Legg. "It's interesting and challenging to develop a program that will help all students get an understanding of the course material - not just the smart ones." "My goal," explains Legg, "is to develop a student's critical thinking process by blending scientific with critical thinking into one system." Students are leaving the course with the same general level of knowledge of science as science majors, he explained. "My students are learning useful, practical things about health, ecology and the environment," said Legg. "This is not a watered down transfer course, it's science for good citizenship."

Computer Art
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Community colleges have been introducing computer art into their curricula for a number of years now; however, for some students, an introductory computer art course consists mainly of learning a software package. At the College of Lake County, art instructor Dan Ziembo set out to accomplish something much different. By conceptualizing the role of the computer as the modern analog to the pen or the brush, Dan has developed a curriculum that introduces the computer as another tool in the artist's repertoire.

It was Dan Ziembo's intention when introducing Art 222, Introduction to Computer Art, into the art curriculum at the College of Lake County to expose his students to electronic digital technology as a tool to be used in making art. In other words, the computer and computer- generated art images and designs were to be thought of in the same manner as all other previous materials of art had been conceived. Artists have always used various mediums to communicate; computer-generated images would be just another in an artist's portfolio of techniques.

Additionally, Dan Ziembo believed that the computer-generated image would and could be regarded as a study tool, a catalyst for thinking, and not an end in itself. In this way, Dan emphasized the process of making art as well as the final product. Reflective creation of the art object through the computer is at the heart of Dan's instruction.

Given these basic aesthetic and pedagogical assumptions, Dan's approach in the class is to have the students solve real life design and drawing problems that are applicable to graphic arts, business, industry, and the fine arts. In this way, he presents both an experiential dimension and an experimental dimension to the teaching of art using the computer. Students experience real life design problems and use the computer as a means of experimenting with solutions.

In Dan's classes, there is no time spent on "drill and kill. " Although he assists students in becoming computer literate not only in the language used to describe the processes of learning and doing but also in terms of the ability to become more facile with this powerful new tool. In this way, students begin to understand how to use the computer logically and rationally to achieve solutions to the problems posed. Furthermore, he demands the immediacy and discipline of a "real design studio" situation; the students keep deadlines and make overtures to businesses in the community to ascertain what the marketplace needs and wants.

As part of his pedagogical approach, Dan has pioneered an unusual method to assess and measure the effectiveness of his class; namely, the numbers of the "graduates" of his courses who are placed in computer art related jobs, or who are able to achieve apprenticeships in the workplace. So far, he has been very successful; everyone who has wanted a job has found one. Those who haven't found or wanted jobs, and who are transferring to a four-year institution have been able to include course work from Art 222 as part of their portfolios showing the depth and breath of problem solving and technical skills learned by including a disc.

Computer Modem Delivery of Instruction

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During the last two years more than one hundred million personal computers were purchased in the United States. A national survey reveals that nearly thirty percent of all homes have personal computers. Add to this the number of computers in businesses that may be available to potential students and we can see that a large number of computers are available for delivery of instruction within any given college district in the United States. Consider also that a majority of households have more than one adult in them. How then can a college take advantage of this wealth of equipment and available students to establish an instructional program for off-campus learners?

Portland Community College looked at a number of ways that the computer could be used to allow students access to regular college classes. After studying several options, the college selected and developed a computer/modem instructional delivery system on which college credit classes are delivered to homes, businesses and other sites having computers available for student use. The system including software, phone lines, and other items is reasonably priced ($10,560.). It utilizes a PC based table top computer, eight phone lines connected by modems to the computer, and special software for students and instructors that provides a simple method for students to interact with instructors and other students. The eight phone lines will serve up to eight hundred students in any number of classes on the network. The student software is very low cost ($17.) and is automated to send and receive mail without dialing or using cumbersome key strokes.

Because of the ease of operation of the system, student and staff training is simplified. A modem class introduction/instructional video tape is played on local cable for recording by students. Training tapes are also available in various college centers throughout the district. Printed materials are also available for training.

The Modem delivered classes became an instant success. During the Beta test phase only three classes were offered and all three filled within five working days. By the third term of modem class offerings, the number of classes reached fourteen with twenty one classes scheduled for fall 1995.

Student evaluation of the network, courses, and instructional value is ongoing. Data collected reveals that students are highly satisfied with the classes and would take more classes as they are available. Completion rates and test scores of the modem delivered classes are identical to the same courses presented in traditional on-campus sessions.

Faculty involvement in the modem classes has been phenomenal. After the first announcement about the classes, forty two faculty requested training in use of the modem for instructional delivery.

The program is highly successful, cost effective and meets the needs of students. Computer modem delivered classes, along with telecourses and live interactive classes, are now part of the associate degree via distance learning from Portland Community College. Within the very near future the college will connect all students into the courses via internet through their home computer and a modem.

Fire Science
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Kirkwood Community College has assumed a leadership role for fire science education in Iowa's community college system, using the state-owned and operated fiber optic system, the Iowa Communications Network (ICN), to deliver technical courses statewide. Kirkwood's program makes Iowa the first to offer a statewide articulated program in fire science.

Until two years ago, when the National Fire Protection Association (NFPA) 1021 Standard for Fire Officer Professional Qualifications was released, Kirkwood offered only a certified training program in fire science. This program was primarily used for promotional advancement by local fire department personnel. The college's Fire Science Advisory Committee then urged Kirkwood to update its certificate program and develop an associate degree in fire science. With the support of the state fire chiefs' association and the Iowa State University Fire Service Institute Extension, Kirkwood did so, revising the program's seven technical core courses to meet NFPA standards, and including general education leadership and management courses in its Program so that it would meet the 1021 standard in an associate of science degree transfer program.

The program now has 268 students, including 28 enrolled full-time. Two years ago, there were only 53 part-time students enrolled. The first associate degree in fire science was awarded to a Kirkwood graduate in December 1994. Kirkwood delivers the technical courses via ICN and occasionally through face-to-face classes. Students throughout Iowa can earn the associate degree by combining general education and business management classes at their local college with Kirkwood's technical courses. A degree can be awarded from either the student's collaborating college or Kirkwood. In addition to accepting course work from other colleges, Kirkwood's Fire Science program recognizes the College Level Examination Program (CLEP) and department examinations for the required technical courses. Course competencies are available for student review prior to testing.

Of the seven technical courses, two are offered over ICN each semester during the evening hours. The core technical courses are: Fire Behavior and Building Design; Chemistry of Hazardous Materials; Hazardous Materials Management; Firefighting Tactics and Strategy; Fundamentals of Fire Prevention; Fire Detection and Suppression Systems; and Instructional Techniques for Fire Service Training. The Iowa State University Extension's Fire Science Bookstore stocks the required textbooks for the technical courses, and provides one-day order processing and shipment to any location in Iowa. Students enroll in the required 43 hours of arts and science courses at their local community college.

Currently, Iowa State and St. Ambrose Universities; Coe, Briar Cliff, Morningside and Mt. Mercy Colleges; the University of Northern Iowa; and Western Illinois University have agreements to accept Kirkwood's fire science associate degree into

their bachelor programs. Discussions for similar agreements are underway with additional four-year institutions.

The primary impetus for developing an associate degree program in fire science was development of the NFPA 1021 standard. Program development was hastened by the knowledge that beginning in 1997, the Cedar Rapids Fire Department will require an associate degree for department promotions. Cedar Rapids Fire Department officials cite evidence that 95% of a firefighter's time is spent on non-firefighting responsibilities, including medical work, planning, admini-stration, and record keeping.

That fact also spurred development of a career mentoring program for young persons interested in entering the fire science program. The mentorship provides an opportunity for the prospective student to interact with professionals in the field and to spend a day with their mentor to experience a firefighter's activities firsthand. Although the mentoring program decreases the number of high school graduates enrolling in the fire science program, retention of those students who do enroll has increased significantly. So far, fourteen fire chiefs throughout Iowa have agreed to mentor young people interested in a career in the fire service.

Kirkwood's program is directed toward four populations: career firefighters, particularly those interested in advancement; persons employed for industrial fire brigades; volunteer firefighters; and high school graduates interested in the firefighting field. The certificate program has also been maintained for those interested.

When the program was first advertised through direct mail and press releases, the Kirkwood Industrial Technologies Department averaged nine inquiries regarding the new associate in fire science degree program each day. In response to the great amount of interest, the college established the Iowa Fire Science Bulletin Board. Statewide student advising is provided through the electronic bulletin board. The bulletin board also provides information on courses offered, mentors, ICN sites/schedule, book and materials ordering information, course competencies, professional chiefs, college and university transfer partners, advisors, and technical course descriptions. Soon, employment and employment testing opportunity listings will be added to the bulletin board, as well. Interested persons can also leave a question or message and the fire science advisor responds in a timely fashion.

Kirkwood's fire science associate degree program is supported by all of the career fire chiefs in the state, the Fire Service Institute Extension at Iowa State University, and the Iowa Fire Service Instructor's Association. These organizations consider the degree program a valuable and accessible option for professionals in fire fighting.

Through maximum use of available technology, this program is available to students statewide without additional staff at Kirkwood or any other community college. This model project is transferable not only to other states interested in fire science distance learning, but also as an educational model for emergency medical service emergency dispatch, and law enforcement.

Genesis Project
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A creative and innovative new program at Clark College that uses technology in teaching and learning is a three-quarter pilot project, The Genesis Project, launched during Fall Quarter 1994. The Genesis Project teaches our students how to use the tools of the "Information Age" to solve problems and communicate effectively. It makes them comfortable and adept when confronted with changing technology.

The twenty participants in the initial Genesis Project class include high school graduates planning to transfer to a four year institution, returning students retraining for new careers, students enrolled through "Running Start", an accelerated high school program, and other working business and professional people seeking to develop higher level computer skills.

Selection criteria for the group included the ability to commit to a year-long series of courses, a demonstrated commitment to excellence in artistic, communication, or manual (working with hardware) skills or in math/computer programming and a level of computer literacy.

The program is divided into three quarters that cover the following areas:

Fall Quarter: Resources.

Learn the tools for using the Internet and identify various communications resources and search tools.

Winter Quarter: Multimedia.

Learn methods of presentation, identify audience and media, prepare information for presentations using sound, motion, and print technologies.

Spring Quarter: Information.

Learn to access data and manage information; learn to use critical thinking to solve individual and team projects; develop evaluation and research skills, complete a special project of individual interest.

Students work in a specialty lab equipped with seven multi-media stations including resources for video, cd-Rom, art, and music. Both digital cameras and video cameras are available. Students learn to access the Internet, to organize information and to present it effectively. Students learn by doing. Each student is responsible for learning one piece of software and then teaching the other class members before the end of the quarter.

Through completion of individual projects, students learn about project management - that it requires a significant amount of time and effort to plan a project and complete it when they do not know all of the tools yet. Sample student projects include:

- Make a CD of an introduction to the College Physics Lab, using video taping, music, sounds, animation, interactive and some quicktime sections.
- Create an interactive environment using computer music and graphics, including a lounge filled with computer-produced graphics and music activated by sensors.
- Develop a communication medium (for example, a kiosk) to educate the local community about ratite ranching (an ostrich-like, flightless bird whose meat tastes like beef, but has a very low level of cholesterol.)

In order to document learning outcomes, students were videotaped at the beginning of the project, articulating their goals and expectations for the program. Each quarter they are videotaped again, reporting on the progress of their projects. At the end of the year, each student will prepare and make a public presentation of their project. Information derived from assessment of outcomes will be used to integrate technology across the campus.

The Genesis Project is truly a community of learners. The role of the instructor is that of coach, rather than authority figure. Next year four faculty members will become students in the project so that they, too, can become skilled in the use of new technologies.

Instructional Technology Mini Grant
Portland Community College
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Purpose: This Mini-Grant Program at Portland Community College was enacted to distribute $200,000 in technology funds to teaching faculty and staff for the purpose of enhancing the teaching learning process through technology. Funds were to be used directly for teaching or classroom preparations.

Category: This project actually will serve students from all five categories. We shall select category two "Programs exemplifying applications of technology to teaching and learning for transfer students."

Strategy: Funds were available last year for the purpose of technology in the classroom. A committee of ten faculty, staff and classified was formed to determine the best method to distribute these funds to the four major campuses at PCC. The committee was chaired by Lucille Hinkle. The committee determined there would be several advantages to forming a process by which any interested individual or group could submit a proposal for grant funds. Departments as well as individuals could submit a request for funds for a technology project. It was determined that innovators would submit proposals for funds based upon projects that were

currently being implemented in a minor way or under strong consideration. The emphasis was placed on the concept of input coming from the "users" of technology not from management. The concept of direct ownership of the proposals and innovation were paramount in the decision to implement this method of fund distribution.

Advantages: It was determined by the committee this process would allow individuals who have innovative ideas to submit projects that normally would have no method for funding. This process would empower the innovators in the college to consider the usage of technology in a classroom setting. Rather than a top down decision from Deans to instructors/staff this was to be a bottom up proposal. The committee set a deadline of February 11, 1994 for submission of proposals. The committee would compile, review and rank the proposals based upon agreed criteria. The proposals would then be submitted to the Campus Instructional Deans for final award decisions.

Criteria: The committee determined that there were six criteria that would be used to judge the proposals. These criteria are:

Significance: The project will enhance student learning and extend beyond the immediate application.

Scope: The project will increase the number of people using technology in the teaching/learning process.

Innovation: The project will demonstrate applied technology to the teaching/learning process and serve as an institutional model for using new technology.

Feasibility: Given the financial and human constraints, the project must be realistic.

Applicant: The person applying for the project demonstrates past interest in the area and has a solid record of completing projects.

Context: The project fits within or expands the goals of the campus and the instructional area.

Outcomes: The committee had 36 individual proposals for a variety of educational technology proposals. The requests ranged in amounts from $470 to $80,000. The committee compiled the proposals and sorted them based upon location within the four major campuses. Each proposal was awarded points based upon the six criteria. The proposals were then judged and ranked from highest to lowest without regard to the amount of requested funding. The ranking process took the committee 12 hours over the course of 3 days. The ranking was turned over to the Instructional Deans who made the final decisions for each respective campus.

Successful Projects: There were some common themes among the projects that were selected for funding. Many of the successful projects utilized multimedia in one aspect or another. Proposals included student multimedia computers, multimedia software and multimedia authoring computers and authoring tools. Several successful projects included computers for faculty use in course preparation and

class presentation purposes. Additional successful projects proposed use of video and video technology for instructional purposes.

Significance of Grant Process:

1. Successfully distributed over $200,000 in instruction technology funds.
2. Funds went to innovators across many disciplines and over four campuses.
3. Staff and instructors had a sense of ownership in the process. This was a bottom up process, not a traditional top down. Faculty and staff who had a vision for technology had an excellent opportunity to fund projects that normally would never receive money.
4. Students were the big winners in that the equipment purchased for this project is currently in use in all four major campuses.

Mathematics
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The Mathematics program provides the courses and support necessary for several targeted audiences one of which is students who choose to transfer to a university or a four-year college. Technology is integrated into the program in a variety of ways. Oklahoma requires all Associate and Baccalaureate Degree students to complete a mathematics course as part of the general education requirements. All three of the program's courses which are designed to fulfill the general education requirement, College Algebra, Contemporary Math, and Introduction to Statistics, are available to the College's distance learners through the technology of Telecourses. College Algebra and Introduction to Statistics are also available through the technology of the state-wide closed circuit television network that offers Associate and Baccalaureate degrees to distinct learners including inmates of the state prison system.

Three classrooms in the Mathematics Center, dedicated for mathematics instruction, have been equipped with a microcomputer, projection screen panel and mathematics software including computer algebra systems. In addition, the Mathematics Computer Lab was equipped with 18 student computer stations. Classroom lectures and lab assignments can thus emphasize interactive experimentation, approximation, and visual analysis. The classroom, lab, and faculty computers are networked. The equipment and software were provided by a National Science Foundation matching fund grant.

With the availability of the above equipment, the program has adopted one of the Calculus Reform Projects for its Calculus and Analytic Geometry sequence. All students in this calculus sequence are also required to have their own advanced

scientific calculator with graphing capabilities for use in numerical, graphical, and algebraic analyses of problems and topics. The concept of the function is fundamental for these types of analyses. In order to better prepare students for studying topics from the function approach, the Mathematics program has designated two of the College Algebra sections each fall and spring semester for its math, physics, and engineering majors. Students in these sections are also required to have graphing calculators. Content in these College Algebra sections is approached from the same numerical, graphical, and algebraic processes that the students will be using in their later study of Calculus, Analytic Geometry and Engineering Mathematics (Differential Equations). Trigonometry, the other pre-calculus course, is taught in the same manner with a graphing calculator requirement.

The calculators and computer software that are used for the pre-calculus -- calculus sequence also have matrix capabilities. These capabilities allow concentration on problem solving and the mathematical modeling process. For example, an applied problem involving tracking the path of an object can be considered in College Algebra in a much more realistic manner using graphing calculators or computer algebra systems to perform the cumbersome matrix manipulations. The mathematical model will be a higher degree polynomial resulting from the simultaneous solution of several equations in several unknowns. Without the use of technology, the consideration of such problems would be impossible or limited to trivial examples.

In Calculus, it is possible to use a continuation of the tracking/position example from College Algebra involving more sophisticated mathematics and technology. Newton's second law and numerical integration techniques can simultaneously be used in the navigation of submarines and other vehicles that have no visual way to compute their position. A stylus is mounted on a very sensitive spring and a piece of graph paper is drawn underneath the stylus at a constant rate. As a result of the vehicle acceleration or deceleration, the needle moves upward or downward on the graph paper. Thus, the vehicle's computers have an analog and/or digital record of the vehicle's acceleration. Assuming that the initial position and the velocity of the vehicle are known, the computers can accurately compute the present position. Of course, the computer must do two numerical integrations. The computation of these numerical integrals by hand is a very tedious process. Using a graphing calculator or computer algebra system, these computationally intense procedures can be performed by students in no time.

In Trigonometry, the graphing calculators and computers allow the students to explore the effects of changing the values of constants in the trigonometric and polar functions without tediously plotting points. In Engineering Mathematics, the students complete computer lab projects in which they explore the effects of different initial conditions and other factors such as harvesting rates or driving forces on population growth and oscillations of springs.

As demonstrated in these examples of real-life applications, technology (the graphing calculator and computer algebra system) is a vital tool that solidifies the numerical, graphical, and algebraic connections among functions and their properties in the study of undergraduate mathematics at the two-year college level.

Mathematics
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In the Spring of 1994, a committee of seven math instructors from three campuses of Portland Community College visited other Northwest College Campuses exploring the direction to take the calculus curriculum. Unanimously, it was decided to implement the Harvard Based Calculus Consortium material because of its philosophy. This philosophy focuses on critical thinking and reasoning rather than drill, with the following primary components: (1) Exploring each problem by the rule of four: looking at problems geometrically, numerically, algebraically and communicating concepts in written and oral form; (2) Approaching problems by "The Way of Archimedes:" formal definitions and procedures evolve from the investigation of practical problems; and (3) Utilizing computers, graphing calculators and other technology to expand the student's problem solving capabilities. We feel this method of teaching will make our students more successful.

During the Summer of 1994, several instructors attended a five day workshop sponsored by the Harvard Calculus Consortium in Washington, and others participated in workshops and the "Third Conference on the Teaching of Calculus" held in Michigan. The Calculus Committee also met for all-day workshops on campus to develop specific direction to the Fall term classes. The course content guides were rewritten to reflect the reform philosophy, and the use of new mathematical software was learned. Then the committee offered a mini-workshop for other Portland Community College faculty on both the reform philosophy and the new mathematical software available. During the Fall quarter, instructors met frequently to share experiences and ideas for classroom activities. Although this is the second quarter of teaching calculus incorporating this method, the continuous multi-campus sharing is on-going and training for other math faculty is available.

The technological part of teaching mathematics has been included in the Portland Community College curriculum for higher level math classes for several years, but in the Spring of 1994 it was agreed to require graphing calculators beginning at the intermediate college level. To facilitate faculty and students' ability to fully make use of this technology, video tapes were made by three math instructors on the use of the TI-85 graphing calculator, and a one credit class was created. Additionally, workshops were held for the education of instructors in the use of the HP-48G graphing calculator recommended for engineering students. The Calculus Committee went one more step forward with technology as the mathematical software DERIVE and MAPLE V are now part of the calculus courses. This computer software enables students to work in teams investigating real life problems by being easily able to change parameters of the problem and answer "what if" questions. Each campus is working toward a classroom where all students have their own work stations. Activities requiring DERIVE and MAPLE V are being written by instructors as well as being adopted from material received from other colleges and workshops.

The technology thread runs throughout the calculus classes. During classtime students work in groups of three or four, and each group presents one of the

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homework problems orally. Technology allows these problems to be investigated visually, and students solve problems numerically without tedious, time consuming numerical work that would have prevented exploration. The mathematical computer software also performs long and tedious algebraic manipulations almost immediately. The results have shown students taking control of their learning with the instructor as the "coach" in a cohesive team environment.

Computer and graphing calculator technology gives students valuable tools in their learning of mathematical concepts. Connections can be made between problems in the outside world and classroom work because the technologies available to them allow for more realistic complicated problems to be explored. Also, when these students transfer to four-year institutions or become immediately employed, they will be well prepared for computer-aided instruction in the classroom or for using computer technology on the job.

The following components are critical to the success of this method of teaching: (1) faculty need access to the computer-aided instruction materials at their desk and at home; (2) they need time to develop classroom activities using the technology; (3) faculty need time to get together for planning and sharing; (4) faculty "new" to this philosophy and teaching method need ongoing staff development; and (5) students need access to the mathematical software outside of the classroom.

Experience has shown that students taught with this philosophy are getting not only a deeper mathematical understanding of calculus but also problem solving skills. When the material and methods of instruction are thought provoking and innovative, both the instructor and the student are more successful.

As a result of this effort, the Rock Creek Campus has identified a Computer Science/Mathematics laboratory to implement computer-aided instruction.

Political Sciences -- American Government
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Every semester in my lower division American Government course I find myself looking for approaches that will help make seemingly abstract material personally meaningful to my students. Like all of us I experience varying degrees of success from class to class and from student to student. Two years ago I began experimenting with a computerized survey of political attitudes and was amazed to find that this depersonalized, high tech teaching supplement was greatly increasing the number of students who were getting involved in the classroom dialogue.

I began by creating a 25 question survey using questions tested in national polls. Some of the questions concerned general ideological preference and some covered contemporary topics on which there were fairly marked liberal-conservative opinion splits. I asked students to take the survey in our Learning Assistance Center and

promised them that I would compile the data which resulted and let them know just how liberal or conservative their class appeared to be relative to other classes. As word got around that the survey was interesting and that at the end of the survey each individual would see his or her own ideological ranking, most students dropped into the LAC and took the survey. The response in class was immediate and dramatic. Students expressed dismay that they might be liberal when they had considered themselves conservative, or vice versa, and our discussions of these terms was enlivened because the subject matter had become more clearly personal. Objections to my questions lead to broader discussions of polling and its legitimacy, and the results from retaking the survey at the end of the semester lead to intense discussions of the effect of education on one's political attitudes.

All in all this experiment with the use of technology as part of a lecture class was so successful that I have since created surveys measuring racial attitudes, levels of political activity, and class opinions on various contemporary events. When used to introduce a new topic area, attitudinal surveys of one's classes draw students into a much more personal relationship to the material and inevitably result in a much higher percentage of students becoming involved in discussions of the material.

The hardest part of setting up attitudinal surveys is in creating the program which is in effect a template which allows you to easily alter questions and experiment with how much to weight various responses. I was lucky enough to find a Computer Studies student who could convert my ideas to a program which can be easily converted from a survey of ideological position to one which attempts to measure racial attitudes or general political knowledge.

I have found that if students are assured that you are interested only in the group profile and not individual rankings, they will take the surveys with both enthusiasm and candor, and that you had better be prepared for and enjoy a drastic increase in classroom participation once you begin experimenting with this very powerful teaching tool.

"The Vision of Ancient Egypt"
A Computer-Generated, Interactive Multi-Media Program
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At Brevard Community College we have created a computer-generated, interactive multi-media program on "The Vision of Ancient Egypt."

Having produced a 70 minute 9 screen presentation in our Theatre 360 and a 60 minute Video tape on Ancient Egypt for our class audiences to share together, we decided to produce an interactive multi-media for the individual student to explore personally.

Using the Amiga 4000 and the Toaster 4000, we have created a program that not only provides an animated presentation on Ancient Egypt for the student, but

enables the student to explore and experience this ancient culture according to his/her individual interests and needs.

The multi-media program will be stored on CD's which can be used on a variety of computer platforms.

This program may be one of the most innovative computer-generated productions on Ancient Egypt to date providing original photography of the sites and scenes of the monumental Pyramids, Temples and Tombs of this remarkable culture.

The specific areas and topics include: Chronological, Geographical and Topical which includes: Pharaohs, Places, Temples, Tombs, Deities, Self-Images, Hieroglyphics and Life beyond Death.

This program can be used interactively both in class with student participation or in a kiosk with individual or faculty participation.

We are also prepared to present this program with Video Projector and large screen for conferences and local colleges.

Measurement of success can easily be determined by computer exams built into the programs.

Since this computer-generated, interactive multi-program can be presented on a universal computer foundation, it can be used on the computers of other colleges and universities.

Writing Center Consultation Project
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The Writing Center Consultation Project, created in April 1994 by Jennifer Jordan-Henley, Writing Specialist at the Roane State Community College Oak Ridge branch Writing Center and Barry Maid, Associate Professor in Rhetoric and Writing at the University of Arkansas at Little Rock, networks community college students with graduate students for writing consultations. The community college students type and then e-mail their essays to UALR where the graduate cybertutors make suggestions and comments on their work. Once the RSCC student has reviewed this commentary, the two students meet on-line at one of several cyberspace writing centers built specifically for them to hold synchronous conversations. There, they discuss more details in the paper, and if the student has made many changes since the e-mail, he or she can paste the new version into the conversation for the cybertutor to review again.

At most universities across the country, this undergraduate-graduate collaboration is far from unique. But for community colleges, who have no pool of graduate

students or upper-division English majors, staffing a writing center can become a serious problem. The availability of the Internet can therefore make an enormous difference in expanding student services and in the student's preparation for transfer to a university.

The initial phase of the project was limited to one introductory literature class and one graduate writing class, and the student comments were overwhelmingly positive. The results of the project also indicated a much greater interest in revision than what normally occurs in a composition class. Once the students had taken care of the basics of organization and proper exposition, they were more willing to work on editing details; as a result, their grades improved.

The exposure to technology made the strongest impact on undergraduate students. They not only learned how to use some of the tools of the Internet, but in several cases, they learned how to type or use a computer for the first time. Danielle Johnson remarked that her Cyberspace experience changed her view of technology and that such experience will eventually be "as necessary as a high school diploma or GED." When she first started the class she felt, like many of the students, that a computer was a rather threatening device. After the project, however, she saw the computer as just another "appliance" like a "telephone, TV, or VCR --only much, much more." Her initial fears disintegrated and were replaced with confidence. Eva Curtis, a 25-year-old nursing student, agreed. "Before this class I had very little computer experience," she remarked. "I had taken a computer literacy class, but the course focus was on knowledge of computers instead of on use of computers...I have gained confidence in using the computer." Anna Logsdon, a sophomore who had no computer experience, concurs. Anna was struck by the "simplicity" of the project, considering how advanced the technology was. "Our society really has nothing else like it as far as communication devices," she said. "The Internet is a system that sounds incredibly confusing and complicated at first, but its use proved to be relatively easy."

Several of the community college students also remarked that they chose to begin their educational careers at a two-year college because the size and lack of individual attention at a four-year school intimidated them. The exposure to a university and to graduate students, therefore, broadened their thinking and acted as an introduction to a university. Susan Qualls, for instance, remarked that she thought more "devotion" was necessary at a university, and she got the impression that the students took their education "more seriously." Mike Lantrip stated that the collaboration could "prepare undergraduates for courses at universities." and Danielle agreed: "The different environments can help each other and give new, different and 'fresh' ideas and advice." Eva, noted that it extended the "capabilities for both schools, as well as expanded one's imagination toward the future."

Students noted a social impact as well. The project "opened my eyes to different people and their lifestyles," April remarked. "My consultant was a Presbyterian minister working on her second master's degree. I had never met a female minister before. She was a really smart lady and I have a tremendous amount of respect for her." And this social impact went further. The majority of the students were more motivated to revise because they were having more fun. One student called the process "a blast," another called it "a ball," and yet another called it "extremely interesting." Danielle remarked that the process is so "new and exciting" that it must have been "how our ancestors felt when the first telephone rang." Students felt that communicating over Cyberspace made them "think more thoroughly and quickly"

and gave them "more insight into reading." One student even described the process as "life changing." Few traditional writing consultations are rewarded by such responses.

Almost all campuses are now concerned with tight resources and duplication of programs. Therefore, it seems inevitable that two - and four-year schools will need to work more closely in the future. With The Writing Center Consultation Project, which is now being expanded to students in other classes, we offer one model for community colleges to easily present their students with some of the same services commonly found on university campuses. The real nature of the collaboration, however, goes much deeper than two different kinds of schools in two different states working together. Ultimately, the real power of the collaborative effort can be found in what happens to the students and both campuses. Clearly, all students involved become more adept with the kind of technology they will be using in their careers in the next century, but by meeting together in Cyberspace, community college students and graduate students learn not only about their writing but about working successfully, and with a common goal, with people whose lives are different from theirs.

SECTION III

PROGRAM AWARD WINNER

Computer Training for the Physically Challenged
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Contact Person: Ray Witherspoon

The Americans with Disabilities Act alerted many competitive organizations to the often overlooked abilities of citizens with disabilities. Traditionally, educational training programs have severely under-served persons with disabilities and the support from private industry for these programs has been inconsistent. Therefore innovative training programs are in high demand. The Computer Programmer Training for the Physically Challenged (CPTPC) program is one such innovative training program.

Since its inception in 1985, the CPTPC program has provided persons with disabilities the opportunity to work as professionals in the data processing field. To gain acceptance into this program, an applicant must negotiate a lengthy application process, consisting primarily of extensive evaluations and taxing interviews. Because the students come from a variety of vocational, economic, and disability backgrounds; accommodations in equipment, scheduling, and teaching methods are woven into every aspect of the program. The success of the student is the primary objective.

The program is capable of training 18 students each year. The schedule is strenuous and the subject matter, demanding. Over a ten month period, students learn computer languages (such as COBOL, IBM utilities, TSO, VSAM, CICS, DB2, OS/MVSJCL and FOCUS) and obtain skills that are staples of the mainframe programming industry. Because the classroom is provided a host mainframe by a local industry leader, students are allowed access to current and valuable mainframe programming technology. At the end of the eight months, thirty-five hour per week classroom portion of the program, students complete an additional two month corporate-sponsored internship. Efforts have been rewarding: The CPTPC program maintains a ninety-two percent placement rate for the 121 alumni. The average salary for the 1994 graduates was $29,689. Success is further verified by the forty similar programs which have been established throughout the country over the last ten years.

As in 1985, private industry and others join forces to support the CPTPC program through the activities of a Business Advisory Council (BAC). Organizations that participate in the BAC include El Centro College, state rehabilitation agencies, federal agencies, and leading business/industry companies and corporations. The BAC steers the CPTPC program to accomplish a formidable goal: **Promoting opportunities for competitive employment for persons with disabilities**.

The organizations of the BAC provide the CPTPC program with tenured professionals in the fields of Data Processing, Public Relations, Education, Vocational

Rehabilitation, Career Counseling, and Finance. All professionals donate the time needed to attend early morning meetings, solicit materials and money, perform classroom and student evaluations, refine curriculum, and recruit companies for internships and hiring. At the heart of the BAC are the committees through which every aspect of the CPTPC program is evaluated. The Public Relations committee aggressively recruits new companies and advertises the activities of CPTPC. This committee also organizes fundraising activities and is the leader in promoting employment as a means to independence for people with disabilities. The Curriculum/Equipment committee ensures that changing technological aspects, including updating of equipment and altering of teaching methods, are addressed with innovation while maintaining the solid foundation that is crucial to the computer programmers' success. The Evaluation committee establishes the necessary criteria on which the students are selected. This committee also conducts formal face to face evaluations of each student during the training. The Internship/Placement committee recruits companies in which students will be placed for their two month internships and provide guidance in the job finding aspects of all the graduates. The four committees function as a proactive force to: Respond to the needs of local area businesses; Help employers and employees look beyond the disability into the limitless realm of ability, proficiency, and talent; Offer a program that replicates industry performance standards; and Provide the support and resources for individuals to prove their capabilities and talents.

The base of the CPTPC program is El Centro College. As the original campus of the Dallas County Community College District, El Centro College historically has served the needs of North Texas' diverse population. El Centro's centralized/downtown Dallas location further enhances its appeal to industry, government, and students.

SECTION III

HONORABLE MENTION

Small Satellite Project
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Sierra's program has led to the development and implementation of a hands-on Space Technology curriculum that uses the design and manufacture of Get Away Special (GAS) projects as its focus. Students involved with this program have already flown a GAS payload which measured backscattered ultraviolet radiation. The students are currently designing a small satellite which will fly in early 1997. This innovative program requires students to manufacture their hardware designs. One of the primary goals of the program is to create a direct link between design and manufacturing processes.

NASA's Get Away Special (GAS) program allows educational institutions to fly experiments aboard the Space Shuttle for as little as $3000. This fee covers the launch and associated services for a 2.5 cubic foot, sixty pound, fully self-contained payload.

The Sierra College program got its start as the result of a happy accident. During the Summer of 1989 a call was made to Goddard Space Flight Center looking for some information on fault tolerant computers used on-board spacecraft. It was anticipated that this would be a nice peripheral topic for an introductory computer science course. A telephone transfer error connected GAS Technical Liaison Officer, Mr. Larry Thomas, who proceeded to explain the GAS program. The first GAS class was offered at Sierra College in the Fall of 1989. A physician in Fresno, California, Dr. Ronald Nelson, donated his $500 reservation with the stipulation that Sierra College students design, manufacture and fly an insulin-tag experiment.

With a grant from the California Community College Chancellors Office, Dr. Nelson's reservation, and forty eager students, we began to create a Space Shuttle payload. We met with Dr. Nelson and discussed his process for tagging insulin. It was clear from the beginning that our task was non-trivial. The process involved mixing three fluids and a dry powder, and then washing the mixture through dialysis. One of the fluids was flammable, which created a very serious safety problem. The students came away from this meeting with a block diagram of the mechanism and a time sequence for the process.

Our next step involved multiple iterations of the design. It was during the design iterations that the microgravity environment of space forced our students to think in a very different way. The temptation was to think in terms of a design that could use gravity to assist with fluid transfers. The microgravity environment is a great way to make students think creatively and seek innovative solutions.

Once a design was agreed upon, we started to manufacture the necessary stainless steel containers with their intricate o-ring sealed pistons that would pump fluid out of one vessel and into another. We went down to the manufacturing area with its manual lathes and milling machines where we were greeted with reserved enthusiasm. Several students spent the Spring and Summer sessions of 1990 learning how to operate the various machines.

The lack of any team members with manufacturing experience was immediately obvious in the results of our metal shaping efforts. We had designed a great deal of hardware that couldn't be built with the available equipment. Although the team had plenty of energy and creativity, the lack of experience in actually building things led to impossible designs. It was realized at this time that manufacturing experts must be part of the design team. We had made a classic error in our organization--we had built a wall between manufacturing and engineering.

People with knowledge of manufacturing methods were recruited to the team, including students, faculty members, and advisors from outside industry. The designs became more simplified, and a completed payload was integrated at Kennedy Space Center in February 1993. The experiment flew on STS-57 and was very successful.

To date we have created a four-track Space Technology curriculum, and we have created a standard 2.5 cubic foot GAS structure. The structure was flown, along with prototype versions of the instruments we plan to use on our microsatellite, aboard the Space Shuttle Discovery in September of 1994. The payload performed flawlessly, recording over 30,000 spectrograph readings. A follow-up GAS flight is scheduled for October of 1995. It will test improved versions of the instruments and make use of a standard computer developed for use in GAS experiments and the microsatellite.

There are several advantages to an education that has a space project as its central theme. First is the excitement built into the program. Space seems to create a strong interest in people without regard to the age group. In our students, the knowledge that they are working on an experiment destined to fly aboard the Space Shuttle is a very deep motivator.

The second major benefit in project-based education is the teamwork requirement. Space Shuttle experiments are so complicated that no single person can understand the details of every subsystem. By working with people from other disciplines, students have mastered interpersonal and presentation communication skills.

Because the students are working on a real-world project, they realize they must meet a schedule in order to make a particular flight. That pressure makes the learning experience close to that of a typical industry setting. The students were successful in meeting all actual deadlines.
Manufacturing knowledge and skills are naturally discovered by the students as the project progresses. Students have understood and mastered manufacturing techniques as demonstrated by the building of their designs.

Students must apply the knowledge they have acquired from lectures and readings from a variety of different disciplines. The application of knowledge is where deepest learning takes place.

The true measurable outcome of this project's success has been the successful flight of two payloads on two different NASA space shuttle flights.

Currently, colleges interested in participating in NASA's program can contact us for the specifications for the following:

1. A standard structure in which to hang experiments to meet NASA's safety requirements.
2. A standard computer
3. A standard battery box
4. Computerized help files to assist colleges to prepare the paperwork required for NASA.

SECTION III ENTRIES

AHS 102 Medical Terminology
York Technical College
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The Problem:

Prior to the Fall Quarter, 1991, AHS 102 - Medical Terminology was taught only in Winter quarter with one or two day sections and one evening section. The very traditional lecture course was difficult to staff with qualified faculty only one term per year and was not accessible to students needing the course during other terms.

The Process:

At the encouragement of President Dennis Merrell, Dr. Jean Watson submitted a proposal in 1989 to the Competition for Excellence sponsored by the League for Innovation in Community Colleges and IBM. Instead of a typical proposal for an instructional unit or chapter, this proposal was for conversion of the fifty-five (55) hour, five (5) quarter hour course, Medical Terminology, to a totally self-paced, computerized course. As one of sixty-five national winners, Dr. Watson was awarded an IBM 286 computer and three days of programming training. After two years of development, in the Fall of 1991, the computerized course was piloted in two (2) class sections. In Winter 1991, two (2) traditional sections with a total of forty-one (41) students were supplemented with two (2) computer assisted instruction (CAI) sections with a total of thirty (30) students. After Winter 1991, only one (1) additional traditional section was taught in Spring 1992 - all other sections were CAI based. From three to five (3-5) sections were taught each semester averaging thirteen (13) students per section and forty (40) students per semester. (Semester conversion took place in Summer 1992.) In the Spring of 1993, the entire program was revised and updated. A major improvement was the inclusion of sound; over nine hundred (900) sound files were created for the pronunciation of important and difficult-to-pronounce words.

The Program:

The CAI based Medical Terminology is a Windows-based hypergraphics computerized program, divided into thirteen (13) separate chapters. Fourteen hundred (1400) words are "hot" objects which provide an explanation or definition when touched by a mouse pointer. Students can listen to the pronunciation of approximately nine hundred (900) words using a mouse click and headphones. The computer must have a sound card to access pronunciations. Students use a faculty constructed workbook to locate the seven hundred (700) words which are tested in fourteen (14) computerized tests. These tests are self-scoring, and faculty provide and hold a separate disk for each student in the class. Students may take chapter tests whenever they are ready for testing.

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The Evaluation:

During the Spring semesters of 1994 and 1995, the data comparing traditional and self-paced instruction over three and a half to four year periods were analyzed. Student enrollment, success rates and retention data were compared, and cost effectiveness was examined by college administrators. From 1988-1989 through 1991-1992, 158 students enrolled in eight (8) sections of the traditional course. There was an average of thirty-two (32) students per term. By contrast, from 1991 -1992 through the Fall of 1994, 440 students enrolled in thirty-three (933) sections for an average of forty (40) students per term.

The Results:

There were four major findings:

1. The self-paced CAI method resulted in significant enrollment increases. Eight (8) sections were offered from 1988-1989 through 1991-1992 with 158 students enrolled in traditional sections. For the CAI sections, 440 students enrolled in thirty-three (33) sections. Currently, ninety-eight (98) students are enrolled in five (5) CAI sections in Spring 1995.

2. Student retention increased in the CAI sections. Thirteen percent (13%) of the 158 traditional students withdrew, but only five percent (5%) of the 440 self-paced students withdrew.

3. The student success rate in Medical Terminology increased as evidenced by the percentage of students completing the course. Eighty-four percent (84%) of traditional students completed the course compared to ninety-one percent (91%) of the CAI students. While the percentage of F grades remained constant in both methodologies, all F's in the CAI sections were the result of unfinished incompletes; no students who completed the self-paced course earned an F.

4. Increased cost-effectiveness occurred when the CAI format began. Part-time faculty were employed for the traditional sections. The CAI sections are handled by the faculty and staff employed to coordinate the RN Transition Program and the CAI lab. The lab has increased from an initial twelve (12) stations to twenty (20) stations currently available for Medical Terminology.

Adaptability by Other Colleges:

This program can be successfully adapted by other colleges. A lab with 386 level or higher computers with Microsoft Windows 3.1 and DOS 5.0 or higher are needed to run the CAI Medical Terminology program. The tests are DOS based, and can run on 286 or higher computers with DOS 3.3 or higher. The student workbook is available as separate chapters in both Word Perfect and ASCII text formats, so faculty can modify the workbook chapters as needed. Student tests are not modifiable, except by the software developer. An initial session is required to orient the student(s) to the methods of navigating through the program and to learn how to access the hot word definitions and pronunciations. This one session typically lasts no longer then twenty (20) to forty (40) minutes, and can be handled by a staff or faculty person with individual students or a class. Student test-taking needs to be monitored as usual. The Medical Terminology program and the tests/workbook are available separately for purchase from the faculty developer.

Applied Graphic Design Technology
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Our society is facing a rapid shift in technology. Information systems that once functioned apart from one another have merged, creating new methods of communication. One of these methods is interactive multimedia.

A simple definition of interactive multimedia is the combining of multiple types of media: photography, animation, video, illustration, text and sound. The most powerful aspect of multimedia is that content can be structured using computer technology. Interactive computer applications tailor content to present information in a rich, dynamic environment that allows the user control over the access of information.

Multimedia is creating at least twenty new lucrative career areas that did not exist two years ago. There will be strong needs for trained individuals fluent in electronic media, with a highly developed sense of visual literacy and strong communication skills, who can work in a team environment.

The Applied Graphic Design Technology (AGDT) department at Collin County Community College (CCCC) provides a technical program that serves a student population eager to make the transition into this exciting new field. Currently we train 400 students per semester with an 86% class retention rate. In our program the instructor becomes a facilitator to foster and inspire work- group skills, utilizing the individual strengths of each person to create a gestalt environment. The students actively participate by sharing knowledge with each other, creating an "information loop," that is continuous throughout the class. Our program stresses instruction in critical thinking skills, essential to the conceptualization of ideas. Students also receive a strong background in traditional graphic skills, together with state-of-the-art training in electronic media.

The development of our program began in 1989, by building a graphic design curriculum based on the printed media. Our initial offerings included a two- year Associate of Applied Science degree with a traditional Graphic Design emphasis. Certificates included categories in Illustration, Production Art, Computer Graphics and more recently Digital Photography.

In early 1991 in response to industry projections, our department began offering courses in multimedia and animation. These courses are structured to provide training that focuses on the planning, development and implementation of interactive multimedia applications. We have designed curriculum for a Multimedia degree option, Multimedia certificate and Animation certificate. The program is a recognized "Center of Excellence" and serves as a catalyst and model for other departments within the college district to incorporate the principles of multimedia into their curriculum.

The AGDT department has established partnerships within our community, bringing real world projects into the classroom. Students work in a setting which provides hands-on application of principles presented by instructors, who offer their professional knowledge of the workplace. Students have been linked with industry partners in the following joint projects:

1. Interactive multimedia kiosk construction with the African- American Museum in Dallas.
2. Interactive multimedia training module construction with EDS.
3. Interactive multimedia designer employment resource for local industry.

CCCC has acquired a state and national reputation as having the most highly developed multimedia program in the Southwest. In July 1994 we were awarded a Carl D. Perkins grant to become a model multimedia center for state-wide dissemination of multimedia curriculum. As a resource center, CCCC will provide leading edge curriculum with professional guidance and training to interested community colleges throughout Texas. El Paso Community College, Navarro College and College of the Mainland have made commitments to serve as regional pilot institutions. In cooperation with these three regional sites, hands-on workshops, courseware and interactive tutorials will be designed to provide professional development for faculty. The Carl D. Perkins grant will give community colleges in Texas an edge in developing similar programs to prepare students for multimedia careers.

Building Construction/B-FIT
Portland Community College
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Portland, OR 97280
(503) 244-6111
C.E.O.: Dan Moriarty
Contact Person: Viola M. Lopez

The Building Construction Technology program offers an Associate of Applied Science Degree of Completion in Building Construction Technology as well as a one year Residential Certificate of Completion, a one year Commercial Certificate of Completion, a two year Certificate of Completion. In addition we offer a six month pre-apprenticeship training program Building Futures in the Trades (B-Fit) designed for women and minorities which has received several state and national awards. The Oregon Department of Transportation has provided scholarships for students in this program for the third consecutive year. Students completing this program are recognized highly by apprenticeship programs.

To remain in step with technological changes in the building industry, we are currently integrating a Professional technical computer lab into our program that will serve other Professional programs at Rock Creek Campus. This lab will contain 20 computer stations supported by state of the art hardware and software. The purchase of this equipment was made possible by the commitment and financial support of College Administration and the Landscape Design Foundation Fund.

Students using the computer lab will be using AutoCAD, LandCAD, Cabinetworks, Quicken, Quickbooks, Uniform Building Code (CD-ROM format), Timberline Construction Gold (estimating, accounting and project management) and Microsoft Word. The addition of the computer lab and personal computers for instructors has increased productivity and accuracy, allowing students to design and build "real world" projects. For example, students are designing and building new furnishing for their computer lab. They also designed built and installed a Student Help Center for the Associated Students of PCC. This symbiotic relationship between student and college has elevated student pride in workmanship and allowed limited tax based colleges funds to be used elsewhere.

These accomplishments are resultant of a partnership of local building contractors, technical instructors, college administration and student participation. Input from our Building Construction Advisory Committee allows our program to adapt to the changing needs of the construction industry. Portland Community College's commitment to staff development through tuition waivers, allows instructors to broadening their knowledge base both personally and technically. Student participation and enthusiasm are at an all time high as proved by uncommonly high enrollment. We are currently working with the Oregon Remodelers Association to provide their members and employees with a technical upgrade program.

Student use of the computer lab not only enhances learning technical skills but provides a forum for the development of personal communications skills. As part of our curriculum students learn word processing skills with a focus on writing resumes, and business correspondence. Students are also introduced to modem and faxing skills.

Enrollment in the Building Construction Technology Program has increased despite the fact that general enrollment at PCC and other Oregon Community Colleges has decreased. This positive trend has enabled us to acquire an additional full-time instructor.

Dental Hygiene Associate Degree
Waukesha County Technical College
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Pewaukee, WI 53072
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Contact Person: Kay Braaten

Technology-based instruction is rapidly changing and growing throughout the country. Many faculty have taken on the challenge of modifying traditional teaching methods to include technology as a means of more actively involving students in the learning process. The new associate degree Dental Hygiene program at Waukesha County Technical College (WCTC) is a prime example of the strong link between technology, teaching and students. This program will be taught in person and by video remote.

When sitting as an audience member for a satellite downlink or some other "distance learning" situation, it never takes too long to discover why the non-transmitting end is considered the "remote" location. Questions can be asked of the speaker, who is presenting from a different location, but it means dialing up a phone number or sending a fax--a situation that bears an eerie resemblance to calling Phil Donahue. Thanks to the technology of compressed video, students at Blackhawk Technical College in Janesville, Wisconsin, will not feel out of the loop when lectures for their new Dental Hygiene program are broadcast from the main WCTC Pewaukee, Wisconsin campus next fall.

As Blackhawk students find their seats for their first lecture this August, 1995 they will be able to see their classmates at WCTC over one monitor and their instructor over another. The 90 miles between schools becomes eliminated. More important than seeing and hearing, though, is the fact that they will be able to actively interact in the discussions by raising their hands and never leaving their seats. Essentially, it will be the same as sitting in the Pewaukee classroom. This technology allows both the picture and sound to come through the same telephone lines. Once a compressed video set-up is in place, one can access any location that has a compatible system. The school is able to transport lectures and continuing education to and from anywhere. If an expert in the dental field is found and has access to similar compressed video technology, the ability to link the expert to the students is accomplished. It gives students access to a wealth of new information.

In addition to viewing the teacher, students at Blackhawk will also see any close-up demonstrations that be may performed. For example, if the teacher shows the use of a specific dental instrument it can be placed on a 3-D document camera which projects a close-up, clear image onto the monitor. Students in both locations will watch the event over monitors through identical technical set ups. The monitors in the Pewaukee classroom will display Blackhawk students and document camera images while the monitors at Blackhawk will show WCTC students and either the instructor or the document camera image or maybe even both through the use of a "smart window."

Since the systems are virtually the same the teacher has the option of transmitting the lectures from either location. It is said that students on the remote end of the discussion are more responsive and assertive than those in the regular class because they know the teacher won't be there all the time. To make the Janesville students feel equally part of the program, the faculty hope to get both classes together for social functions through a new dental hygiene student club. Much of the curriculum development for the new associate degree, however, remains relatively routine. Faculty are enthusiastic by the technology because it adds a new dimension to instruction. Dental hygiene is a particularly good experiment since it's psychomotor based rather than just cognitively based. But what happens when the system breaks down. There are already plans in place to handle potential "glitches" that may arise with the new technology. Extra time is built into the class schedule to accommodate situations such as electrical problems and downed phone lines. Term papers will be given with enough lead time to allow for mail service, and assignments may arrive to Pewaukee by means of fax or post office. In addition, students can access faculty office hours by making an appointment to call on the phone or to talk face-to-face through the video. Staff and advisory committee members from both locations will save the time of driving to meet one another since they will hold their meetings using the compressed video.

While this technology appears to have vast potential for the field of education, the concern over elimination of staff positions has some people slow in embracing its possibilities. In reality, there will always be a need for dental faculty at Blackhawk and WCTC to work in the lab and clinical setting. It just changes faculty members responsibilities. In the future, Blackhawk may reciprocate the Dental Hygiene compressed video arrangement by allowing WCTC students to hook up to their Physical Therapy Assistant program. While it's considered Blackhawk's program, there is also a need for the training in Waukesha County. With the new technology, students and employers from both areas can benefit.

The competency and terminal objectives for success as a dental hygienist will continue to be organized in a systematic application of knowledge through technology. The success of the student will be enhanced through this creative approach to setting standards for decision making, demonstrations to measure competency levels and ability to identify relevance to the field of dental hygiene delivery of services.

By investing the dollars needed to purchase this new technology our students will be prepared to go into the competitive, rapidly changing environment of the work world.

Dental Hygiene Nursing Home Project
Owens Community College
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Contact Person: Trudy Palmateer and Ann Britt

This project is the result of an effort to include a major emphasis in geriatric content in an already content filled curriculum in our Dental Hygiene Program. We were limited by the number of credit hours existing in the curriculum yet felt a desire as well as a need to provide our students with didactic information and clinical experience with this population group. It was also a desire to increase the interaction between dental hygienists and other health care providers through an interdisciplinary approach to care. The project includes an orientation to the structure and services available at the nursing home, observation and participation in the provision of dental services in the nursing home and culminating in the implementation of an educational project to meet the needs of the nursing home.

Rationale :

It was expected that the Nursing Home Project (NHP) would provide benefit to the dental hygiene student, the geriatric population and to society in general. The geriatric population is the fastest growing segment of our population and this population is expected to continue to increase.

Dental hygienists are seeing more clients from this population group in private practice and other clinical settings. There is a need for the dental hygiene student to understand the characteristics of this population which includes not only disease patterns but also alterations in and barriers to the delivery of oral health care. It was

hoped that the dental hygiene student who is exposed to this population through the dental hygiene curriculum would be knowledgeable and more comfortable while treating these clients and would take a leadership role in meeting the oral health needs of the geriatric population.

The geriatric client benefits from exposure to the dental hygiene student and the care he or she can provide. The dental hygiene student is able to provide valuable education and preventive services to the clients of the nursing homes. Access to care is enhanced by the hands on experiences provided by the students. The nursing home personnel would benefit from the sharing of information for oral hygiene care and preventive information that the students provided.

Society would benefit through the education of dental health care professionals who are caring and sensitive to the health needs of this special population. Access to care for the geriatric client in a variety of settings will be enhanced. Through the early exposure and education of dental hygiene students to the care of geriatric patients, the fear of the unknown will be eliminated as a barrier to care. Education of the care givers to oral health information will also be of benefit, especially in the detection of oral health problems and preventive measures to maintain oral health.

Description Of The Project:

This project provides field experience for Community Dental Health I and II and extends for two semesters. The Nursing Home Project will have three primary areas of focus. The areas of focus will include experience in providing dental care at the nursing home, an orientation to the structure and total health services available at the nursing home, and the development of a project for the nursing home based on a needs assessment.

A clinical rotation for students with the Dental Dispensary of Northwest Ohio, Mobile Dental Unit. Two students and a faculty member go to the nursing home with the staff of the dental dispensary which consists of a dentist and a dental assistant. This rotation allows the students to observe dental treatment and to participate in oral examinations, denture cleaning and identification and oral hygiene education.

An orientation to the structure and services available at the Nursing Home. This includes guest lectures from nursing home staff and includes exposure to the interdisciplinary health care team including administrators, social workers, nurses, nutrition care personnel, physical therapists, occupational therapists, physicians, and dental personnel.

The development of a Community Dental Health Project to be implemented at the Nursing Home during the second semester of the project. Each nursing home is assigned 4 to 6 students to work as the project group. This group of students use a problem solving model of assessment, planning, implementation and evaluation in developing the project for the nursing home.

During the assessment phase the students assess the oral health program in place at the facility, the oral health needs of the residents and the capabilities of the staff who provide the oral health care. Planning is based on the needs assessment. The students develop a plan to modify the oral health care of the residents. This plan is be based on the needs of the individual nursing home.

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Implementation of the Project is done with the cooperation of the nursing home staff.

Evaluation of the project is accomplished through the use of surveys completed by the students and by the nursing home personnel.

Nursing Home Project Evaluation:

Both the dental hygiene students and the contact person at each nursing home were surveyed to evaluate the total experience. The objectives of the total project were met in that the students felt that their knowledge of the target population had increased, they felt more comfortable working with this population and they were confident in the interactions with the residents and with the nursing home staff.

The nursing home staff felt that the students communicated with the residents and staff, provided a benefit to the oral health care of the residents and provided valuable in service information to the care givers in the nursing home.

We were pleased with the first year of the project. We are offering the program currently for the second time with a few modification. The incorporation of the nursing home project has provided us with some secondary benefits that were not anticipated. These include an increase in networking with nursing home personnel for improving access to dental care and the development of a working partnership with the Dental Center of Northwest Ohio for a variety of other activities.

Diesel Service Technology
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Contact Person: Viola M. Lopez

The Diesel Department at Portland Community College, Rock Creek Campus, offers either an Associate Degree or a two year Certificate of Completion in Diesel Service Technology. This program consists of twelve modules, two per term. The modules are as follows:

Shop Practice	Fundamentals of Hydraulics
Truck Power Trains	Fundamentals of Electricity
Engine Diagnostic Tune-up	Fundamentals of Fuels
Diesel Engine Rebuild	Heavy Duty Power Trains
Mobil and Hydrostatic Systems	Diesel Starting and Charging
Brakes Steering and Suspension	Fuel Injection Pumps

Through a partnership with The Halton Company, we acquired two Interactive CD-ROM videos. These interactive videos were designed by Caterpillar Corporation for the training of their service technicians. Students are able to use these computers after class as a supplement to their technical training. Four programs are currently available and more will be obtained this year. Current available programs are: Hydraulics, Electricity, Metallurgy and Diesel Engines. These programs are

100% interactive including pre-test, post-test and instruction. The length of a program is ten to thirty hours. This variance is dependent on the individual student's ability.

Academic and human relations skills required by industry have been identified and integrated into the technical content of these courses. Through a matrix system, the Diesel Department is able to track the instruction of these skills.

Students enter the program with different skill levels. Some students need extra assistance to reach the skill levels set by our local industry. This is accomplished by providing our students with tutorial assistance through our Technical Learning Skills Instructor. Tutorial packets have been developed specifically for Diesel students which have deficiencies in reading, writing and arithmetic. These packets are constructed with exercises that deal with Diesel related matters. If a student is working on reading skills, the student may be reading about a specific engine or fuel system. If a student is working on math skills, the student may be calculating the volume of a hydraulic cylinder. Through applied learning, students understand the importance of attaining these skills.

Our industry demands that our students understand work ethics before they are hired. We have developed activities to meet this demand. All of the students in our program must participate in these activities as they are integral parts of our course content. Examples of activities include working in groups, team learning, conducting an informational interview with a potential employer attending sessions, instructing employability skills and participation in the Diesel Club.

Our students come to us with a wide variety of academic, social and technical skills. Our purpose is to provide tailored assistance to the individual students and provide them with all the tools required to succeed in the classroom and in their future careers.

The Electronic Resources Center
Oakland Community College -- RO/SF Campus
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C.E.O.: Martha R. Smydra
Contact Person: Mary Anne Nagler

The Southfield Campus of Oakland Community College serves as a center for the education and re-certification of adults in service professions. These include health technologies, nursing, law enforcement, and fire service. For many years, accrediting agencies of these disciplines, as well as students and faculty voiced the need for a full-service library on the campus. A library existed at the Royal Oak Campus, five miles away from the Southfield site, and there wasn't sufficient space or resources to construct another traditional library. In its desire to be responsive to the needs of students and faculty, the College created an electronic library at the Southfield Campus in September 1994. This could not have occurred without dramatic changes in library technology.

The electronic revolution occurring in libraries and publishing is illustrated in the following quotation from the April 15, 1994 Library Journal. "Reference librarians of the future may be located anywhere there is a telephone and a computer with a network connection." One of the reasons for the shift to electronic media in libraries is that the search capabilities and speed of conducting searches is greatly enhanced in an electronic format. Because a greater amount of data is being digitized, the only practical access to the information is by computer. As a result, many new products will be available electronically in the future.

The library at the Southfield campus is called the Electronic Resources Center. It occupies 20' x 52' of space. A small reference and circulating collection of books that will eventually number 600 volumes is contained in two low range shelving units. There are some unbound periodical issues and newspapers. Most of the space is taken up by computer workstations that connect the library user with the world's literature.

Key access to health and nursing literature is provided by the Library User Information System (LUIS). Because Oakland Community College is a member of DALNET, a consortium of 14 multitype libraries, it shares the on-line catalog that includes periodical index databases. DALNET includes university, community college, and four hospital libraries, as well as some special and public libraries within a 35-mile radius of Detroit in southeastern Michigan. Resource sharing is encouraged between the libraries and students can obtain materials through interlibrary loan or reciprocal borrowing privileges.

The periodical database indexes on LUIS that are available at OCC are the Wilson Periodicals Index, ERC, and the Cumulative Index to Nursing and Allied Health Literature. The databases are updated monthly. Students can search LUIS at OCC campuses or from their homes with a modem. The ERC will then obtain copies of requested articles. Currently we rely mostly on interlibrary loan to satisfy demand for articles we can't provide electronically. However, affordable alternatives exist and continue to improve. It is possible to access an electronic index, order the cited article and have it faxed to the ERIC within an hour by using a commercial vendor. The staff continues to explore methods of document delivery that will best serve OCC students. The Electronic Resources Center also subscribes to full-text CD-ROMS.

These are sources meant to be read or consulted for their content, and often include graphics in the form of charts, tables, photographs, drawings, etc. Products used currently include the Detroit News, Bookshelf, and Radiologic Anatomy. A CD-ROM database that is very popular in the ERC is the Health Reference Center, produced by Information Access. It allows the student to view or print the file text of abstracts, periodical articles, medical definitions, and pamphlets relating to health. Another useful source, Academic Abstracts, produced by Ebsco, provides the full-text of 125 general interest periodicals that include some medical journals.

The ERC continues to evolve as student needs are identified and new products are made available. There are many databases that require sophisticated searching techniques, such as MEDLINE, and the librarian will perform these searches for students and faculty. Short-term plans include adding additional CD-ROM sources and student access to the Internet. This year the ERC will be networked with the campus computer lab and Individualized Instruction Center. This will greatly

maximize student access by making library resources available on 45 computers at the three different sites.

Every effort is made to publicize the ERC as an important service to students. Promotional information is distributed to all the Southfield Campus staff and an open house was held to acquaint students, staff and faculty with the ERC. Instructors are encouraged to schedule orientations that will introduce students to research methods and the resources available to them. Currently the ERC and the coordinators of other support services for students are taking a team approach and visiting all of the classrooms at the Southfield campus. The goal is that every student be familiar with the OCC agencies that can help achieve academic success.

Circulation statistics show that the ERC checked out and discharged 351 books during the first 4 months of operation. Most of these books were interloaned from other OCC campuses. During that same period, over 1000 questions were answered and 13 class orientations presented. There are no statistics available on the number of periodical articles printed from the full-text databases, but we've gone through 15 printer ribbons in four months!

The most gratifying measure of success is the reaction of students. There are many positive comments as they search for timely information quickly and thoroughly. If the information explosion continues at its current pace, the world's knowledge base will double every 70 days by the year 2010 (Serials Perspective Fall/Winter '94). Since we encourage students to become active and lifelong learners, the skills needed for electronic information retrieval are critical. The Electronic Resources Center is dedicated to satisfying our students' informational needs and providing instruction in mastering information retrieval in the electronic age.

Enhancing Clinical Education Through Community Service

Owens Community College
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The Optometric/Ophthalmic Technology Program at Owens Community College utilizes clinical education sites which include optometry practices, ophthalmology practices, and optical dispensaries for program students to gain experience in the performance of clinical skills. Over the course of three semesters, each student is assigned to five different sites in order to experience a variety of clinical settings and clients. At the beginning and end of each rotation, the students rate themselves on their performance of skills and their comfort level dealing with clients. In spite of the number of excellent clinical facilities, the majority of clients whom the students work with are adults; very little experience is gained with the pediatric population.

To increase the students' experiences working with younger clients, the Department Chairman contacted The Sight Center to arrange for the students to participate in and assist with vision screenings provided to children enrolled in the local Head Start program. In addition, local doctors who provide vision screenings at

elementary and nursery schools in the area have utilized the students, again adding to their experiences working with pediatric clients.

The objective of having the students involved in the screenings was to increase both their knowledge and comfort level when working with the younger client. The children who are screened generally range in age from three to twelve years. These individuals are quite different from adults; some are frightened, some are unable or unwilling to follow directions, and some may be malingering in attempt to get attention or new glasses.

The technician students must use good communication and people skills in order to successfully deal with these clients. The students must exhibit patience and be very encouraging; they also must be creative and inventive at times to persuade the younger children to participate in the screening procedures. At screenings where two students are assigned, they often work as a team in obtaining the screening results. One student may kneel on the floor beside the child and explain "how to play" the games, while the other student points to symbols on a visual acuity chart. The Program students have often voiced their anxiety related to working with the younger client prior to the screenings. Many indicate on their self-assessment that they feel unsure about their abilities to obtain accurate results due to their lack of experience working with children. Since the students have been participating in the screenings, the majority have indicated that they feel much more comfortable working with the pediatric client. Some of the students come back very excited and talk about how much fun they had assisting with the screening. Others have even asked to be assigned to future screenings. All in all, this program has increased the students' knowledge and comfort level when dealing with children.

An additional benefit that has developed because of the students participating in the screenings is the service aspect. Each student is providing a service to individuals who otherwise may not have been served. Some of the students have reported how fulfilling it was to be of assistance. On occasion, students have volunteered to participate in other services offered by The Sight Center.

During the students' educational experience, approximately one week of their clinical time is spent in providing vision screening services to children. The students come in contact with approximately 80 to 100 children, thus increasing their experience in dealing with the pediatric client. The Optometric/Ophthalmic Technology Program plans to continue its participation in the vision screening programs. It has added a dimension to each student's clinical education which results in a better qualified graduate and at the same time provides a community service.

Environmental Technology
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Contact Person: Carol Jeandron

The goals of Nunez Community College are based on the premise that its programs to be effective must address the needs of a student population which is diverse in many areas including socially, racially, ethnically, politically, and economically. In meeting the needs of this diverse population, a population which includes many non-traditional college students, one of the stated educational goals of Nunez Community College is to offer a variety of occupational programs to prepare people for immediate employment. Because of the world in which our students exist today and will function in tomorrow, this goal must be accomplished through programs which extensively incorporate the application of technology.

This application of technology is at the core of a new program offered at Nunez Community College. In response to an identified need for highly trained and exemplary qualified workers in the new field of environmental remediation, Elaine P. Nunez Community College initiated in the Fall 1994 semester programs in environmental technology. Nunez thus became the only college in Louisiana to offer a certificate in Bioremediation and an Associate of Applied Science in Environmental Technology. Of paramount importance in these programs is the technological training of a diverse student population from Louisiana for jobs which previously could be acquired only by those who were educated out- side of the state.

The students enrolled in an environmental program at Nunez represent a diversified population. During the Fall 1994 semester, 48% of the students were female and 52% were male. Of particular interest is the fact that 55% of the students enrolled in environmental courses were over the age of 39 years. Thus, the environmental programs are teaching a segment of the population that is not considered to be traditional college students. In addition, to further increase the diversity of its student body, Nunez has recently employed a Minority Recruiter who is actively recruiting minorities into the environmental programs.

In recognition of the diverse needs of the individual and the demands of a democratic society, Nunez Community College provides comprehensive educational programs. Thus, one component of the Associate of Applied Science in Environmental Technology is a strong core of general education requirements, which are transferrable to major colleges and universities in the area. The course work includes College Algebra, English Composition I and II, Humanities, Social Science, and Speech. To this core, the environmental technology program adds courses in Introduction to Hazardous Materials; Environmental Health and Safety; Technical Communication Skills; Environmental Science; Environmental Sampling; Site Assessment; Environmental Law; and Federal, State, and Local Regulatory Compliance. Additional courses including Louisiana Wetland Ecology and Pollution Prevention and Waste Minimization are available as electives.
The determination of the courses to be offered in the environmental technology component of the programs was made in conjunction with industry. Nunez Community College's working with industry in this endeavor was and is of

paramount importance for the students. Thus, through various means, including an active Environmental Technology Advisory Council, Nunez continues to work with representatives from industries such as Mobil, Amax, Murphy Oil, and Calciner. This cooperation with and input from industry assures that students acquire the necessary technical knowledge required for jobs in the environmental field.

In addition to Nunez Community College's having a close relationship with local industry, the College is also a member of the organization Partnership Environmental Technology Education (PETE). PETE is a national partnership of community colleges which was formed to advance and enhance education in the field. Two Nunez faculty members represent Louisiana and are active participants in PETE.

Based on recommendations initiated by industry and knowledge acquired as members of PETE, the environmental students during the Spring 1995 semester are participating in field work involving the usage of the latest technology in the areas of site assessment and sample collecting. These activities are being conducted by Nunez faculty who have expertise in their respective disciplines. These "hands-on" activities are proving to be especially beneficial to the students. Additionally, Nunez environmental students have available computer models and films for the appropriate course topics. The College has recently acquired a student computer learning facility which is available for students enrolled in the environmental program. Thus, through various means, up-to-date technology is playing a major role in the environmental courses.

Training at Nunez is broad-based with an emphasis on the petro-chemical field since heavy industry in the area deals with these products. In the past 6 months, a Superfund site has been declared on the list in the New Orleans area and another is slated to be added to the list shortly. Although these environmental disasters are indeed unfortunate, the clean-up will assure that jobs are available for students completing the College's environmental technology programs. In addition, students may choose to bridge their two-year Associate of Applied Science in Environmental Technology to four year degrees in Safety Management, Environmental Engineering, or Environmental Management. We at Nunez Community College recognized a need which existed in our community and our state which was not being addressed. We have addressed that need and are working cooperatively with industry to provide students of diverse backgrounds with an educational program rich in the application of technology.

We at Nunez Community College through programs in the environmental technology area are indeed meeting the needs of the individual citizens and the needs of our state.

The Flex Lab
Santa Fe Community College
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Santa Fe Community College's new Flex Lab provides a way for students seeking short-term occupational training to master computer skills through computer assisted, self-paced instruction. Students' success is measured through competency-based tutorials which require "mastery" performance before students move on in the program. Student success is also supported by instructors and instructional assistants who are trained in the essentials of adult education and individualized instruction.

The program coordinates computer-assisted instruction with all Divisions, by identifying priority needs in areas such as computer technology, nursing, languages, science, and mathematics. By providing self-paced options in these areas, many students are able to fulfill program requirements within the boundaries of their own schedules. We often find that traditional classes have low enrollments due to scheduling difficulties and when we offer the same class in the Flex Lab, enrollment increases dramatically.

We foster coordination through our support of interdisciplinary approaches to instruction in appropriate areas. Examples of efforts in this area include a course call "Race to Save the Planet". The course is supported by CD-ROM resources, computer-assisted instructional software, workbooks and a textbook. It is crosslisted under TECH and BIOL, and covers topics in Biology, Technology and Environmental Science.

The Flex Lab emphasizes ongoing training and cross-training of instructors, instructor assistants and staff. We do this through in-house training utilizing instructor expertise and Tech Task Force training activities by supporting staff development activities and training opportunities and encouraging independent professional development. We also take an active role in encouraging other Divisions' faculty members to explore and utilize computer-assisted instruction and alternative instructional techniques.

Academic studies show that students involved in a Personalized System of Instruction (PSI) often achieve better scores, retain the information longer, and show more of an interest in further courses than students in traditional courses. Our own students support these findings and continually provide us with new ideas to expand and improve the program. Although a variety of problems may arise, it is hard to imagine difficulties which would overrule the increase in opportunity for students we would otherwise be unable to serve.

GURU
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State University of New York
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C.E.O.: Allan Hershfield
Contact Person: Nancy McCarthy

GURU is a computerized career planning program developed by a faculty member, Nancy McCarthy, to meet the specific needs of the Fashion Institute of Technology. F.I.T. is a highly specialized college in the State University of New York system. Our programs are designed to prepare students for specific occupations in the fashion and related industries in the areas of design, technology, management and marketing. Prospective students must declare a major before entering the college. It is, therefore, imperative that they have a clear perspective on their interests and strengths and how these apply to the demands of given careers.

While printed career information and various self-assessment instruments have been available, very few tools have attempted to directly link these together. The computerized career planning programs that existed covered major fields in a broad way. Nothing had been developed which studied an industry in detail and combined this with an in-depth personal assessment.

GURU was conceived primarily as an educational rather than a predictive tool. Using generic artificial intelligence software, the program teaches students how to assess their own unique self-profile and how the results correlate with career choices. Its goal is to actively engage the students in making intelligent career decisions based on a thoughtful self-analysis and accurate occupational information rather than outside "expert" opinions or hazy impressions of what jobs entail.

The hour-long program begins with an introduction to the value of career planning and the need to first know oneself and the components which make each person unique. Through a series of thought-provoking questions, it then guides the students through their own assessment of interests, skills, preferred work style and values. These questions are based on well-validated theories developed by John Holland and Carl Jung, as well as Professor McCarthy's twenty five years of experience working with the fashion industries.

At every step of the process the computer interacts with the students providing analyses through graphs and text, illustrating key patterns and showing how the pieces fit together in a coherent whole. At the end of the assessment process the students have a clear and succinct profile of themselves. The computer then matches this profile with that of over 100 occupations in the fashion industries. Students receive a list of the careers which are promising choices for their individual profiles. They can now request in-depth information on any of these from the computer.

Once students have gone through the interactive system, there is an opportunity to meet individually with a faculty member or to join a group workshop. This helps them to understand key differences in individuals and how each person has a specialized role to play in the workplace.

GURU is unique for three reasons:

1. It is designed as an educational program -- there are several computer assessment programs available for students, but they are designed to be predictive instruments. At every step in GURU students are learning what the career planning process is and how to use this effectively throughout their lives.

2. It integrates major assessment theories rather than using only one -- this multi-lens approach results in a rich and complex picture of the student in a relatively short amount of time. By using different theoretical approaches it is possible to identify major themes in terms of a person's interests, preferences and values.

3. It explores one industry in depth -- other computer assessment programs are general in nature and attempt to cover all fields. By organizing and assessing information on the career opportunities in one industry, GURU establishes a model for developing a program specific to other industries.

The program has been in active use for two years. We plan to track the level of career satisfaction with participants once they have graduated. However, response so far from students has been overwhelmingly positive. GURU has been used by high school students, transfer students and adults contemplating a career change. Regardless of age or level of experience, participants have been enthusiastic about its contribution to their learning. Each user is asked to complete a program evaluation on GURU's effectiveness in raising self-awareness and how this relates to career choice. On a scale of 1 (low) to 10 (high), 92% have ranked it at 8 or higher. When asked if they would recommend the program to a friend, 100% have indicated they would do so.

We have been particularly encouraged by its use with prospective students enrolled in the Tech Prep program established jointly with two New York City high schools. These are inner city schools and the students, for the most part, will be the first in their families considering college. The Tech Prep program is designed to facilitate their choice of specific occupations and GURU was used as an integral part of this project. Students who traditionally resist paper and pencil assessment tests were very engaged by this computerized program. Counselors who conducted the group follow-up sessions were impressed by the depth of self-understanding acquired by students and their grasp of the principles behind career planning theory. This year the size of the project doubled with equally positive response.

GURU was created specifically for the special occupational needs of one major industry and its related components served by F.I.T. It is a model which could be adapted by any institution with programs of study leading to careers in specialized industries. Professor McCarthy was able to develop GURU drawing on her industry knowledge and career counseling background. A similar program could be successfully developed through a collaboration between an industry specialist and a career counselor to properly categorize the jobs included in the system.

Innovation in Utilizing University Research Land Laboratories

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A prime example of innovation in delivering a community college agricultural program is currently under way in western Illinois. Glowing success has occurred from a unique cooperative effort between John Wood Community College and the University of Illinois Orr Agricultural Research and Demonstration Center near Perry, Illinois.

During the 1970's the University of Illinois was searching for a site for an agronomy research center in western Illinois which would utilize native forested soil types. In 1978, after careful review, a site of 278 acres was identified near Perry, Illinois on which agronomic research and demonstration projects could be conducted. In 1974 John Wood Community College, headquartered in Quincy, Illinois was established. Its agriculture program began in 1976. In 1978, when the search for an appropriate site for the University of Illinois research center was being conducted, the agriculture staff at John Wood Community College encouraged innovation toward a new cooperative spirit toward improving the research and educational relationship for residents in western Illinois. Through the encouragement from a local Resource Conservation and Development Council, a unique cooperative, programmatic relationship developed between the University of Illinois and John Wood Community College.

The University agreed to provide three acres of property from its agronomy center for construction of the Community College building. A $500,000 facility was constructed on this three acre site by John Wood Community College. Furthermore, the University agreed to allow its research plots to be utilized as a teaching laboratory for JWCC students. The University also agreed to assign research plots to the Community College for utilization in demonstration efforts designed and conducted by students as part of their learning exercises. Furthermore, the University also agreed to hire Community College agriculture students to work for them as laboratory assistants. In exchange for these services the Community College provided office and shop space in the JWCC facility for University of Illinois activities.

Since the University also established a Beef Research Center in 1989 next to the Agronomy Center, it was further decided to expand the relationship with the John Wood Community College Agricultural program. Currently students are also allowed the opportunity to utilize the Beef Research Center as a learning laboratory and as an employer for their internship experience. John Wood Community College now has a Beef Certificate Program which focuses upon expanding knowledge, competencies and skills oriented to cow/calf production with the Beef Research Center serving as the location for students applying knowledge and skills learned in the classroom.

For the advantage of students and tax payers, these two institutions are now working closely in designing various demonstration and research activities from

which the students apply knowledge learned in the classroom. Never has there been a better example of the compatibility of research and education. Various agronomic studies focus on tillage practices, herbicide studies, variety plots, population analysis, various species of plants, fertility rates and other practices. Additionally, John Wood Community College hires University of Illinois staff members assigned to these Research Centers as part-time instructors. This level of scientific expertise is rarely available for community college agriculture programs. The applied knowledge and experience which students learn at the Agronomy and Beef Research Centers are of tremendous assistance in obtaining internships and full-time employment.

This cooperative effort has been beneficial for everyone involved. The students have given highly favorable evaluations of the classes which have practical "hands-on" learning experiences in the field laboratories. The classroom lecture by the instructor is greatly enhanced by the valuable exercises completed by the students. The definition of a working laboratory is greatly expanded in a setting such as we have at this site.

Students are the primary beneficiaries of the unique cooperative relationship occurring between the U of I and JWCC. Furthermore, tax payers receive maximum benefit from expenditure of public funds through this unique cooperative relationship of utilizing resources of research and educational agencies. Any educational institution which has research agencies nearby needs to expand avenues of cooperation to more efficiently deliver the highest quality educational offerings possible. Application of knowledge learned is a critical component of any educational delivery system. Only through making greater utilization of resources available can educational organizations hope to provide current technological information for its students.

Marketing
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The purpose of the Marketing Curriculum at PSTCC is to prepare the student for an entry-level marketing position, such as director of planning for a nonprofit organization, telemarketing supervisor, assistant department manager in retailing, upon graduation. As such, courses are designed to be very applications-oriented with a variety of projects and assignments performed in conjunction with local businesses. In addition, Marketing Advisory Committee members take an active part in the program by serving as mentors, guest speakers, and employers of marketing intern students. Below is a brief course-by-course description of the activities PSTCC marketing students participate in.

MKT 2220 -- PRINCIPLES OF SELLING

Students engage in numerous role plays, and sales presentations, some of which are videotaped to critique. Assignments include prospecting for actual clients in the Knoxville area for industrial goods and services. Professional salespeople from

companies such as Johnson & Johnson, Excel Telecommunications, Farmer's Insurance, and many others give product demonstrations and guest lectures.

MKT 2260 -- DECISION MAKING FOR MARKETERS

In this class students develop a research project about a topic of interest to PSTCC students. They write their own questionnaire, design a sample and data collection method (one team used e-mail), collect the data, analyze it, and write a report. They get hands-on experience with spreadsheet, statistical, database, and word processing software.

MKT 2280 -- PROMOTION

This is a "hands-on" advertising class, the culmination of which is the successful execution of an advertising campaign presented before a panel of marketing professionals from the community. Last semester, three student groups chose to plan campaigns for West End Soda Brew, Cartoon Classics, and to promote candy for the National Confectioners Association. As part of a team-teaching effort with the Video Production Technology students, the marketing students executed storyboards and wrote scripts for commercials, which were filmed and edited by the VPT students. This experience simulated the producer/client relationship that would occur in industry. This joint venture exposed both classes to consulting, interpersonal skills, and time management, as well as video equipment operations.

MKT 2300 -- PROMOTION TECHNIQUES

The major activity in this class is the planning and implementation of a special event on campus. One team has assisted the Placement Director for several years with Career Day on our three campuses. About 25 companies usually participate. The students develop a theme, which is "Careers Under Construction" this year, promote the event throughout the campus, and assist with planning and execution of the event. This year the other team will be helping the Wellness Coordinator with Operation Health Check, a community health fair.

MKT 2320 -- RETAILING

In both Retailing and Promotion Techniques students design and implement a promotional display in a 4' by 18' display window connected to the classroom. The objective of their display is to get attention and sell a product, business, or idea. They often solicit the donation of props and supplies from local businesses for this project.

MKT 2420 -- CUSTOMER SERVICE

Both the Retailing and Customer Service classes have been conducting mystery shopping for one of the local malls. The students choose several stores to visit and evaluate according to an observation form. The mall management shares the results with the store managers to encourage them to promote good customer service. In both courses, students also evaluate local businesses which involves extensive contact with customers and employees of the companies.

MKT 2471 -- MARKETING INTERNSHIP

The current marketing intern serves as a personal assistant to the Marketing Director of Oak Ridge Mall. The student works 20+ hours a week assisting with publicity efforts, sales reports, the mall merchants' association, and special

promotional events such as fashion shows and grand openings of new stores. Upon graduation, this internship may materialize into a permanent position with Crown American Management Corporation.

Multi-Media Police Traffic Law Training (CD-ROM Based)
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The Texas Commission On Law Enforcement Officer Standards and Education (TCLEOSE) required all Texas police academies and criminal justice programs to teach a substantial block of instruction for traffic law enforcement (i.e., 72 of 600 required instructional hours). The traffic law instructional section of a police officer's training is one of the most difficult to teach while also holding the students' interests. Like many legal codes, the traffic laws are written in language and logic that is frequently difficult to understand and is often confusing for the students. With the current curriculum, the students are usually required to demonstrate competencies by recognizing traffic violations from only written descriptions of various traffic situations. A survey of traffic law instructors has shown that "traffic law enforcement" is a difficult section to instruct due to the lack of readily available instructional aids capable of demonstrating violations of Texas' traffic laws. The instructional aids that do exist are often old, relatively outdated and require only limited involvement of the student in the learning process.

This program addresses this void through the development of instructional materials to assist traffic law instructors in fostering student competencies and eventual, improved on-the-job performance. This program provides inter-active, computer multi-media, instructional materials in CD-ROM format to be used as audio-visual aids in the traffic law instruction block. The program's objective is the development of the needed computer multi-media/audio-visual instructional materials for use in teaching and evaluating one's knowledge of Texas' traffic laws. Frequent use of these instructional materials will enable students and police officers to improve their competencies on Texas' traffic laws.

To demonstrate the feasibility of this approach, an example of a moving violation of traffic laws with different levels of seriousness or dangerousness has been reduced to computer accessible files on CD-ROM diskettes. This demonstration shows how computer software can be utilized to enable these new instructional materials to be used with either a projection system for instructing entire classes or on computer terminals for individual student training and testing. This program is designed to be so user-friendly and interesting that police officers/students will voluntarily spend more study time on this instructional topic, thereby increasing their competencies and understanding of Texas' traffic laws. These new instructional materials will bring realistic and upgraded traffic law competencies into Texas' vocational curriculum for its police officers. Additionally, they could eventually be used by the state to more thoroughly evaluate driving license applicants' knowledge of Texas' traffic laws.

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This program begins with a "Roll-call" introduction to resemble a police roll call. Here the student receives his/her assignment concerning traffic laws and instructions on how to operate the program. The next step is the main menu where the student will choose between the instruction or the testing modules. The instruction module will present a choice between viewing traffic violation scenarios or studying traffic law definitions from the traffic code "law book." The traffic scenario is presented from one view as a police officer might see it and the student would then be present with a "report notebook" with instructions to explain his/her observations. The traffic scenario would then proceed with the presentation of additional information that a police officer might be presented with once the vehicle has been stopped, such as driver's license, vehicle inspection, insurance coverage, etc. At this point the program queries the student whether or not he/she would issue a citation for the violation. Regardless of the answer to this decision, the student is presented with a number of queries concerning the traffic violation and the additional information to probe the student's understanding of issues that might make the traffic violation more or less serious or dangerous and the driver thus more or less deserving of a citation. During this analysis period, the video presentations of the violation and of the additional information are both available to the student to be replayed to double check his/her observations or lack of observations. Each scenario would then end with a final inquiry of the student to determine if the student would still stand by his/her initial decision concerning a citation or would consider changing that decision.

At all times the student has available a "law book" icon which will take the student immediately to the applicable sections of the traffic code. Once in the traffic code, any words or phrases that are defined in the traffic code are presented in hypertext and that definition is immediately available. If a section refers to another section, that reference is in hypertext and that section is immediately available to the student. In the law section, the student will also have the option of seeing another video presentation of compliance with the section of law. The concept here is to present a scenario and then encourage the student to research the applicable law to that situation, and thus learn the law while simultaneously learning how to recognize violations and exploring the decision-making process which goes into whether or not a citation will be issued. Once a student has completed all the traffic scenarios and has read all the traffic law, then the testing option in the main menu will become available. The test will consist of 100 randomly selected traffic scenarios (including those presented as compliance with the traffic code). The student will be required to determine if a violation exists and then to identify the violation correctly.

Novell Education Program
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The Novell Education Program is an industry certification program that gives candidates credentials to work in the field of computer networking. Candidates must complete a series of from one to eleven certification exams at a Drake testing center

to achieve certification. The three basic levels of certification are: Certified Novell Administrator or CNA (One exam). A CNA has the skills necessary to maintain an existing network by carrying out daily administrative tasks; Certified Novell Engineer or CNE (Seven exams). CNEs have the skills necessary to come into a bare office complex and design, install and troubleshoot a network based on the client's needs; Enterprise Certified Novell Engineer or ECNE (Eleven or more exams). An ECNE can do the same tasks as a CNE and also has the capability of implementing multi protocol internetworking on an enterprise-wide or global level. Candidates usually take courses corresponding to these exams at a non traditional private education center.

HCC obtained Novell Education Academic Partnership (NEAP) status in the Spring of 1993. Obtaining this status was necessary so that we could use the Novell curriculum materials and Novell Certified Instructors. HCC worked with these instructors to modify the Novell curriculum by adding Certified Instructors. HCC worked with these instructors to modify the Novell curriculum by adding practical lab exercises, quizzes and exams, and other practical instruction. The quizzes and exams are based on the certification exams that correspond to the course the students are taking. In the private education setting, the student would not see any of the certification exam material except in an unsupervised assessment test environment. Other exercises in each course are based on real-work scenarios the students will likely encounter as network professionals.

HCC has taken the Novell education program and incorporated it into an Associate in Applied Science degree program in Network Administration. The AAS program adds a solid foundation to the certification program by supplementing the Novell curriculum with other traditional computer science and general education curricula. Each of the individual Novell courses in the AAS program is offered for three credits, which means forty-five+ hours of instructor contact per course in the State of Maryland. We therefore give the student approximately 50% more instructor contact than the student would receive at a private education center. We also lengthened the class time per week from two hours fifty minutes per week, to four hours per week once a week for twelve weeks. This gives the students and the instructor time to get involved and stay involved in classroom activity commensurate with the difficulty and length of tasks in a network environment. A twelve week semester gives the students time to prepare for the corresponding certification exam before they start the next semester.

HCC also offers parts of this education program in computer-based emulation training, for general exam preparation, and in an independent study format. We have also found that many of our students, as well as off-the-street retail customers, are interested in our supplemental reference material offerings. We carry a regular selection of after-market and Novell publications for general sale in our campus bookstore. We have also taken this program off-campus to remote sites to train entire business communities with our traditional curriculum. Many employers are eager to have this program on-site. The fact that the courses are taught for college credit, and therefore paid for by the employer, motivates the employees to enter the degree program. The courses are taught in the evenings, so no time is lost during the day or in a commute.

HCC also offers a wide range of internships and co-op programs. These components add to the students' practical knowledge and make them more employable. We are also working with non-profit corporations who are interested in having a network

installed. These non-profits pay for the equipment and the instructor's time. The students are given necessary information about the client and asked to design a network to meet the client's needs. The students are then taken to the job site where they install the network. We are piloting this program at HCC where we are doing a 300+ node NetWare 4.x installation with almost 100% student volunteers.

HCC has thus taken this highly technical, industry-based education curriculum, and repackaged it for traditional curriculum delivery at a traditional pace in a traditional classroom setting. The quantifiable results are that HCC students enjoy a much higher success rate, have a much lower attrition rate, and are heavily recruited for employment while they are still attending classes.

A survey of HCC students showed that 95% are passing the certification exams on the first attempt. 100% pass by the second attempt. This compares with a roughly 65% pass rate for the private education centers on the first attempt. Because of this high success rate, HCC has a much lower attrition rate. Many of our students complete the CNE certification within the first year of degree courses. Students at HCC are frequently recruited for employment, not just by individual employers, but by technical placement recruiters who are anxious to have our students in their pool of high-tech candidates. Salaries in this field are in the top 20th percentile and, given that this is an emerging field, and market saturation is conservatively two decades away, many of our students can look forward to retiring without a career change. The fact that we have a waiting list for this program with seven hundred or more names on it is probably a good indication of its success since the same curriculum is widely available at private education centers in the area.

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The nursing faculty at Owens Community College applied for and received a grant in school year 1993-1994 from the Helene Fuld Trust. The grant was specifically written to obtain funds for interactive video and computer assisted instruction hardware and software. The faculty wrote their wish lists and we as a group set out to furnish our Helene Fuld room and purchase as much as possible with the monies allotted. The next step, incorporating this technology into our curriculum, has proven to be a challenge.

The brainstorming sessions that followed produced a variety of possibilities, ranging from the total replacement of traditional lecturing to using clinical simulations as clinical practice time. We found out many things about ourselves as faculty and as individuals also. Most of us continue to have a strong attachment to the traditional teaching methods -- lecture and practice, and support the one on one nurse patient relationship. We explored the role of teacher in our nursing program and finally decided on three specific areas where this type of instruction would be of the most

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value to our students and where faculty would be comfortable with alternative learning.

The first area we looked at was the positive impact these types of instruction could have on students who need repetition and review. On our campus the nontraditional student is the norm and the students in the nursing department reflect that diverse population. Many of them are not comfortable asking questions in the lecture periods and faculty are not always able to repeat as often as some might need. We have found software that allows the student to review materials similar to class content at their leisure and as often as needed. We specifically looked for programs that had immediate feedback for the student with rationale for correct and incorrect answers that they completed the test sections.

These same programs can offer a structured review for test preparation. An excellent example of this type of program is Vital Signs from the Fuld Institute for Technology in Nursing Education. Faculty in our beginning clinical course assign this interactive video as a supplement to the clinical laboratory experience. The student can use the video as often as they desire and move through the content at their own pace. They actually utilize the screen to check placement of their fingers for finding peripheral pulse sites, and receive immediate feedback on the correctness of their choice.

Another important area for self paced review is preparation for the NCLEX-RN. We purchased a comprehensive review program for our graduating students. This program is not an assignment per se, but can be utilized by the students anytime. We believe this benefits the students in more ways than just the review. Many of our potential graduates cannot afford the expense of a professional seminar review and the on campus availability relieves them of that stress. Another advantage is the computer experience itself. For some examinees the NCLEX-RN is their first contact with computerized testing. This type of test simulation can mimic the actual test site experience and in that process decrease some of the potential anxiety.

The second area of use defined by the faculty is that of independent study. The faculty believes that students should be actively involved in the educational process and that students should be given the opportunity to learn on their own at times as well as learning with others. Independent study assignments are made in several courses with specific dates for completion of the material. This content is not discussed in the classroom setting, instead it is incorporated in the clinical experience. Independent study fosters thinking skills such as analysis and evaluation and the student can then apply this knowledge to actual situations in a clinical setting.

Finally, the faculty decided that clinical simulations could provide an alternative way to deal with clinical absences if we have a program that can meet the clinical focus for that student. This has worked well in some courses and the students are receptive to this idea.

This entire process has been a positive learning experience for the nursing faculty and we are in the planning stages for another grant application. The catalogues are filled with new and more sophisticated technology. We are talking about ways to move those ideas into the classroom and continue to enhance the educational experience. Those "wish lists" have reappeared.

Psychology 250 Telecourse
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Law Enforcement Psychology (PSY 250) has been offered as a required course in the Administration of Justice Program at Southwest Virginia Community College for several years. The course is especially designed for individuals who are already working in some capacity as a police officer. Current officers often have difficulty taking the class due to work schedules and responsibilities that impede travel to campus. Therefore, the course is now being developed in video format which will make it widely accessible to individual officers or agencies within and outside of the state.

The course is designed to enhance the officer's awareness, understanding, use of practical solutions, and applications of content to the occupation. Throughout the course, special emphasis is placed on "Psychological Survival" and its relationship to the overall functioning of the officer and physical survival. The course format and content will provide current and prospective officers with training not typically covered in traditional programs. Topics cover the total career of the officer. Content includes issues in training, ethics, community relations, women and minority officers, family crisis, psychological survival, crisis intervention with children and the emotionally disturbed, suicide, managing stress, traumatic incidents, alcoholism, retirement, loss of life in the line of duty, etc.

Before beginning the project, a proposal was discussed with the U. S. Department of Justice Committee, federal and state training academies, and several local law enforcement agencies to determine interest and need for such a telecourse. A national study conducted by the Research Department of the U. S. Department of Justice indicated that 90% of the officers surveyed had indicated that dealing with personal stress was their number one training need, from a listing of 110 training needs. Course content for PSY 250 has been developed in response to that need.

Officers and other professionals working in areas related to each topic covered were included in the development of the telecourse. Over 80 officers and professionals including top law enforcement training officers and police psychologists worked with the FBI Training Academy, US Marshals Training Center, Virginia State Police, Los Angeles Sheriff's Department, and Pima County Sheriff's Department in Arizona. Police association executives working with disabled officers and surviving families of officers killed in the line of duty are also participating. In gathering information and research to develop the content, much of the focus has been on the officer's perspective. The extensive use of interviews with officers helps to emphasize this perspective. The scenarios also illustrate more visually some of the discussions. Patrolmen, Deputies, Troopers and top division administrators in local and state agencies have been assisting with both the interviews and scenarios. The local law enforcement academy has provided extensive opportunities for taping officers in training and also the scenarios. Area schools, counseling centers, funeral home, hospital, and additional faculty and staff at SVCC have been a part of the planning,

set construction, publicity, and tapings. Four area businesses are providing furniture and props for the sets.

As the instructor's segments are taped, the editing process will pull together the interviews, presentations, and scenarios into the lecture segments. Additional photos, illustrations, graphics, and music are then added. The technology department of East Tennessee State University is assisting with some special affects and animated portions for the videos. The projected length of the video approximately 9 - 13 hours.

Publicity began with a news release in area newspapers. In February of this year, agencies and training centers will be sent information regarding the telecourse. This is to give agencies adequate time to consider funding officers enrolling in the course as part of their annual budget. Brochures, posters, and information sheets will be sent to all law enforcement agencies in Virginia. A selection of municipal, county, and state agencies in all other states will also receive this information. An update on the telecourse with additional registration information will be sent to these agencies in June. A news release will be provided to law enforcement publications in each state about May or June. We are also in the process of seeking approval of the course for re-certification and training credit for officers in each state. Notification of this approval has already been received for some states. The officer would receive training credits in addition to the three semester credits received from the college. Many law enforcement agencies now associate college credits to rank and pay. The target date to have the course available for student enrollment is Fall 1995.

This is not a "for profit" project for the college. It is a means of providing a course, for college credit, to individual officers or law enforcement agencies across the country. The videos would be made available to officers at "production cost." Arrangements can be made for the officer to take exams for the telecourse at their own agencies. A proctor will be able to mail these to the college for grading. Open enrollment will also allow the officers to begin the course as their schedule and interest require. The officer will have the usual sixteen weeks to complete the requirements for the course.

The development of this telecourse exemplifies the quality and extensive use of telecourses that can be achieved by college audio-visual departments. The college is not limited to its immediate service region. The technology available today provides opportunities for colleges and universities to reach a greater market in providing needed opportunities for personal and career development that the student may not otherwise be able to access.

Surgical Technology Program
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Utilization of Video Taping as a Teaching Tool during Lab Practice and Practical Examinations at Owens Community College. Beginning surgical technology students all must successfully complete a mock surgical practical examination prior to beginning the clinical portion of the program in the second semester. In order to be eligible for this final practical examination, the students practice extensively in the classroom laboratory and successfully complete unit practical examinations. These practical sessions, unit examinations and the final mock surgical examination are videotaped.

In the three years since this videotaping has been in place, there has been a significant increase in student retention and a decrease in student errors when entering the clinical laboratory experience in the second semester. We have also noticed a decrease in complaints from the clinical facilities regarding the technique of students when they begin the clinical laboratory component of the curriculum.

By videotaping students during the practice sessions in the first part of the semester, they are able to review their own errors and those of their team members. In this way, they not only learn to perfect procedures, they also learn how to become a better team member. They have the opportunity to view the whole realm of the room and learn about things they normally would not be able to see when they are focused on their own individual tasks. The success rate on the final mock surgery practical examination has increased as well, because students have been able to recognize and correct mistakes as they occur. During the mock surgery practical examination students are permitted to make mistakes, however, they must be able to recognize the error and correct it during the performance of the examination. Students then have the opportunity to view their mock surgical examination and identify areas of strength and areas that need improvement.

Faculty members have been videotaped demonstrating various techniques so that students are able to view and assimilate good technique. This information has been condensed for use by other health technology programs, so that accepted techniques are taught the same way across the curriculum. Video tapes have also been made of students demonstrating certain difficult techniques, e.g. sterile gloving and open gloving which depict students struggling at the beginning of the semester and perfecting the technique by the end of the semester. In this way, newer students can view past students and see the progression toward success. Students can view these videotapes when assigned to the college lab but at a time when they are not performing hands on practice. This permits all students to utilize the college lab time more efficiently.

A final advantage to video taping is that students learn to work, while being observed, in a more structured setting. This puts them more at ease when they enter the clinical setting and function under continual observation by instruc-tors, preceptors and other members of the surgical team.

Thus far, video-taping practice and examination sessions have proved to be most valuable to the surgical technology students at Owens Community College. We will continue to evaluate the use of this technique and plan to incorporate it in other areas of the curriculum in the future.

Veterinary Technology Distance Education
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The Veterinary Technology Distance Education Program was created to address the shortage of technicians and increase access to geographically isolated students and employees.

The shortage: The technician shortage in Florida is evidenced by the receipt number of job announcements (300+ per year) versus the usual number of graduates (35). The UF Veterinary School graduates are usually twice the annual number of technician graduates. The mission of the College is to serve the community, both students and employers. The Veterinary Technology Program considers "community" to mean the veterinary community and students interested in this field. Since this is the only program in Florida, the community is statewide. Approximately 40% of the current on-campus students either commute more than 50 miles or relocate to this area to enroll in the Program.

Students Isolated by Distance and Work: The typical community college student is 30 years old and tied to home, community, and job. These students cannot afford to move to enroll in the veterinary technology program. College space limitations prevent offering an evening program. Moreover, an evening program would still only serve local students. Creating new programs in other locations would again serve only the local students and would be very expensive. The distance program provides an opportunity to earn a degree to the largest number of students, over the greatest geographical area and most economically.

All general education and support course requirements are met through the local community college or transfer credits. Major courses are taken via a computer online. A national bulletin board service provides electronic mail between students and faculty, bulletin boards for discussion of topics within a course, and conference rooms for real-time interactions. Libraries of software, text files, and graphics are also accessed on the service. Students in lecture courses attend weekly live discussions in the conference room in addition to submitting completed assignments. Final exams are proctored by the local community college liaison or the employer.

Laboratory courses rely on the same bulletin board service for both synchronous and asynchronous communications between faculty and students. In addition, the student has contractual arrangements with veterinary hospitals to provide

instruction and evaluation in the specific skills required by the course. The Program faculty member assigned to the course provides to both the student and the clinical supervisors a detailed list of the skills, instructions on how to perform them, and specific criteria to be used in the evaluations. The hospital signs off on each skill they promise to teach. Students need to find additional clinics for skills that cannot be acquired in their primary site. The curriculum covers companion animals, food animals, birds, exotic animals, and horses. Students and faculty will have weekly discussions online to monitor progress and provide coaching. Licensed veterinarians and their graduate technician employees are qualified to teach and evaluate the skills required in the laboratory courses. They are motivated because the student/employee gains new abilities which have immediate application in the clinic. The evaluation criteria are specific and unambiguous so that all parties will interpret them in the same way. A final control is evaluations of lab skills on-site at St. Petersburg by regular faculty. These evaluations are scheduled at the completion of each semester's courses, or four times throughout the Program.

In the Fall Semester of 1994-95 twenty three students enrolled in the first semester courses. A second class of eight new students began in January 1995. The program plans to accept new students every semester. The on-campus program applications and enrollments have not been affected by the addition of the distance program. The program director expects the distance program to become twice as large as the on-campus program which has a total enrollment of 170 students. The distance program could easily serve at least the thirteen states which do not have an accredited veterinary technology program. By enrolling thirty students from each of these states the program would grow to 420 students in one year.

In order to implement the distance program the faculty took graduate courses and studied on their own to become familiar with the commercial network, distance education techniques, and computer software. They have reconfigured each course to be suitable for distance learning. This involves converting notes and text files, making up new assignments and learning how to utilize e-mail and online conferencing to facilitate distance learning.

In addition to the faculty efforts, the College had to approve the distance program and seek approval from the State Board of Community Colleges and the Southern Association of Colleges and Schools accrediting body. Accreditation for the distance program from the American Veterinary Medical Association is in progress. The on-campus program has been accredited since 1978. In order to secure additional funding for the new program the development office began the first campaign targeted at technician employers and graduates. Solicitation letters have been sent to the veterinarians and graduates in the state as well as to corporate sponsors. Approximately $10,000 has been raised to date, and this amount will be matched by a special state incentive grant program.

The Veterinary Technology Distance Education program is unique in providing distance education in an occupation demanding a wide variety of manual skills and knowledge. Graduates are expected to handle a wide variety of species of animals, operate radiology and laboratory equipment, perform anesthesia and assist in surgery. The model established by this program is potentially applicable to over 60 other Associate in Science degree programs in Florida which are found in only a few of the 28 community colleges. It meets the needs of students and employers throughout the state in a cost effective manner by taking advantage of local skills, equipment, and computer technology.

SECTION IV ENTRIES

Diversity Intern Program
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Elgin Community College's Diversity Internship Program was developed with the purpose of encouraging outstanding minority students to become community college teachers. It provides a qualified minority applicant who has earned at least a B.A. degree with the opportunity to teach a limited number of courses in a specified department and complete a department-related project with a faculty mentor from within and possibly outside of the department. This internship is designed to enhance the interns' success in graduate school and/or provide the intern with an incentive to complete or focus their graduate study toward community college teaching.

A key ingredient in the program is a partnership which is established between the community college and a senior institution, the latter which identifies and supports the graduate student intern through tuition waiver for one graduate internship course. The community college supports the intern by providing a full-time faculty mentor and compensation appropriate for the number of classes taught (generally 2 to 3) and/or a project designed to assist both the intern and the community college.

Another critical element in the program's success is the full- time faculty member from the department who serves as a mentor to the intern. The mentor's role is one which provides assistance and support to the intern, serves as an instructional faculty model/coach, and furnishes the intern with feedback on teaching/learning strategies. Additionally, the mentor provides valuable information to the college as to the effect of the program and what changes could be made to enhance it. The mentor establishes early contact with the intern to address questions of concern and maintains contact throughout the term by weekly meetings in which issues of concern are addressed. The mentor and intern visit each other's classes -- twice each -- during the period of the internship with the purpose of sharing ideas and suggestions for improvement along with other teaching strategies. These visits are non-evaluative in nature. In addition, the mentor reviews all relevant materials, i.e., syllabi, assignments, examinations, etc. and assists in their improvement when needed; further, the mentor reviews graded essays and/or other relevant papers to assist the intern in assessing writing.

Depending upon the number of graduate hours completed, the intern will be assigned a classload equivalent of 40 to 80 percent of a full-time instructional faculty member's teaching responsibilities. Two levels of the internship responsibilities are possible: Level One for an intern with zero to fifteen graduate hours completed; Level Two for an intern with sixteen or more graduate hours completed. In some instances, a portion of the responsibilities may be a project related to the departmental needs. The full-time faculty in the department are

involved in not only the review of the credentials of the applicant for the internship but also in the determination of an appropriate level of responsibility for the intern.

Elgin Community College's program began with a pilot effort during the spring semester of 1993. One graduate student in English from Northern Illinois University was placed as an intern in our Liberal Arts and Human Services Division. After that pilot experience, the program was revised to its current state based on suggestions from the intern, mentor, and the faculty senate. Currently we have a partnership with DePaul University with an intern in the Sociology Department.

Faculty Diversification
College of Lake County
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Over the years, the College of Lake County has had a continual increase in students of color; however, similar increases had not occurred in the faculty ranks. With the knowledge of the positive impact minority role models can have on students of color and on the general campus community, it was determined that proactive methods must be implemented to attract, employ, and retain the culturally diverse faculty needed to lead the college into the twenty-first century.

With the commitment of the Board of Trustees and the President, a Minority Faculty Recruitment Committee was formed to make recommendations for the recruitment and retention of faculty of color. The following list includes the primary recommendations of the committee.

Activities:

1. Faculty positions for the following academic year should be approved no later than the January Board of Trustees Meeting so that the hiring process could be completed by late spring. This time frame would increase the college's competitive stance.
2. A non-discipline specified faculty position should be created. It should be given to the division that has a need for additional faculty and has identified an excellent candidate.
3. The position descriptions should be carefully constructed so as to require necessary qualifications without eliminating qualified applicants.
4. Position announcements should be placed in a variety of publications and submitted to organizations and colleges/universities that have a number of people of color enrolled in graduate programs.
5. Personal recruitment should be conducted at colleges, universities, and professional organizations by minority representatives, faculty members representing the disciplines, and associate deans.

6. Search committees should be established after the advertising process has identified an appropriate applicant pool. Positions should be re-opened until an appropriate applicant pool is identified.

7. The affirmative action plan for faculty searches must be followed in establishing committees and in developing methods for their operation.

8. A travel budget for the active recruitment of faculty of color should be established.

9. A part-time vita bank to increase the number of people of color hired as part-time faculty should be developed. Part-time faculty should be recruited from local minority fraternities and sororities and other agencies/organizations.

10. A campus environment which supports cultural diversity should be created through professional growth and development activities and incorporation of cultural diversity.

Since 1991, the college has had thirty-four available faculty positions. With the support of the Minority Faculty Recruitment Committee, Faculty Senate, Associate Deans, and Personnel Department, 50% of these positions have been filled by people of color increasing the percentage of minority faculty from 6% to 13%.

As the college personnel were meeting with success in their recruitment activities, it was important that a campus environment be created to accommodate greater diversity among the faculty and to provide appropriate support systems for the new faculty. As a result, on-going cultural diversity programs and activities were implemented to assist faculty and staff to better understand and value diversity. In addition, divisional faculty and administrators provided various transition assistance for new faculty.

There are many strategies that community colleges can employ to increase cultural diversity within the faculty There are no easy solutions. Having the desire to increase cultural diversity is commendable; however, implementing the necessary procedures to accomplish this task may be difficult. At the College of Lake County, we have made a commitment to meet the needs of our diverse student body. We have begun to build our pipeline of connections and networks to improve our effectiveness in recruiting and retaining faculty of color.

SECTION V

PROGRAM AWARD WINNER

Professional Growth Center Technology Project
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The Professional Growth Center for the College of Lake County has been deeply committed to the concept of technology in the classroom. In the early 80s and through the early 90s, this commitment has meant a fairly traditional but successful offering of technology short courses and computer training to all faculty and staff. By the Fall of 1993, the Professional Growth Center had taught 69 workshops, and 610 people completed instruction. This work represented 9,760 hours of instruction.

In the Fall of 1993, the Professional Growth Center and the College decided to take a more pro-active and innovative step in furthering technology in the classroom. To accomplish this goal, the Center acted on two fronts: classroom technology and multi-media consultants and the saturation technique.

Classroom Technology & Multi-Media Consultants.
The Professional Growth Center made four assumptions that would change its approach to technology training in the classroom:

1. The In-House Expert. Training an in-house expert is better than bringing in a hired gun from the outside.
2. Take the Long View. Training an in-house person took longer than hiring a trainer from the outside, but in the long run it would be worth it.
3. The Great Communicator. Many "experts in technology" have weak communications skills, often speaking over the heads of the participants, making to many assumptions, and using overly technical language. Training someone who has the ability to communicate clearly is essential.
4. The "Great Person Theory". A charismatic person who is excited about an idea will spread that enthusiasm to other faculty better than an uninspired technocrat or an administrator who dictates program changes.

Keeping these assumptions in mind, the Professional Growth Center and the College began a carrot vs. stick approach toward selecting the committed faculty members. They offered two faculty members 6 hours of release time (out of 15 normal load) each semester to do nothing more than research and experiment in the use of technology in the classroom. One faculty member would be selected in the IBM and one in the Macintosh platform. Several applications were received, but using the

above assumptions, the teachers selected were respected teachers from the Humanities and Business Departments, both outstanding teachers in their fields. During the learning period, the two faculty members were not required to do consulting or teaching of technology in the classroom. A further use of carrot vs. stick approach was applied at the end of that training period where the selected faculty members taught classes to other faculty, who themselves were able to apply for graduate (in-house) credit for taking the class.

As this work proceeded, the members of the Professional Growth Center identified several positive outcomes:

1. They found that in fact faculty learn better from other faculty than from outside individuals.
2. The trained persons were available for consulting after the training, unlike an outside expert who was expensive and difficult to reach.
3. Cost was minimized. It was cheaper to train two of our own than to hire an outside consultant.
4. A snow-ball effect occurred. By selecting charismatic teachers, the excitement over technology in the classroom was contagious. By this writing (only one year after its inception) over 40 faculty are now using Compel and Action! multi-media. Each of these 40 is now sharing his/her excitement with other teachers, and themselves are able to help others use technology in the classroom.

The Saturation Technique.

In the Fall of 1994 the Professional Growth Center and the College began blanketing the College with software related workshops and short courses (the latter were offered with 1 hour of graduate credit for the faculty who took them). The Center offered 41 workshops and short courses in Windows 3.1, WordPerfect 6.0 for Windows, Multi-media for IBM and Macintosh, Quattro Pro For Windows, Power Point, Internet, Advanced E-mail, Minnesota Gopher, etc. With this ambitious offering we needed to make some assumptions:

1. Let the true expert teach. These were not just taught by our computer faculty, but we involved secretaries (classified staff), in the teaching process. These are often the people who use the products the most.
2. The jealousy factor dissipated. With more and more people using technology both in and outside the classroom, it could be contagious. People would want to be part of the "in-crowd," and use the latest technology.

Again this approach produced a number of positive results:

1. The College became very technologically aware. Saturation brought awareness, as with many offerings, the average faculty member was found discussing the advantages of using the Internet, or of WordPerfect 6.0 for Windows over WordPerfect 5.1 for DOS. The campus became aware of the wonderful benefits of technology.
2. A breakdown of classification titles occurred. With classified staff and faculty teaching these workshops, this provided not only professional

growth for the participant who took the class, but professional growth for the classified staff who were able to see themselves successfully in a teaching role (along with the self-esteem and pride that went with that). Side note: It was wonderful to hear a secretary tell of how she was a nervous wreck before she taught a class for the first time, but how afterwards with all the praise she received, how great she felt.

3. Desire breeds desire. Faculty who had previously used the computer for word processing only were now clamoring for computer time in the labs, and began demanding multi-media equipment in the classrooms. Old handouts were being spiced up with modern technology.

4. The program was successful! In one year, the Professional Growth Center provided 502 people with technology and classroom related skill.

The College of Lake County has greatly benefited from this more pro-active and innovative approach to technology. A few traditional stereotypes were broken, and a lot of professional growth has happened, both for presenter and for participant.

SECTION V

HONORABLE MENTIONS

A PROGRAM OF FACULTY & STAFF DEVELOPMENT CENTERED ON THE APPLICATION OF TECHNOLOGY

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THE PROGRAM IS INNOVATIVE AND CREATIVE.

In 1991, Borough of Manhattan Community College (BMCC) received a Title III Strengthening Institutions Development grant from the U.S. Department of Education. There were two long-range objectives:

1. to train faculty to deal effectively with an underprepared and diverse student population.
2. to increase student success in both basic skills and content curricula.

Short-range goals to accomplish these objective included the following:

1. to establish a BMCC Center for Faculty and Staff Development (Teaching Center) to help train faculty in a variety of strategies, especially writing/reading, speaking and computing across the curriculum techniques. Across the Curriculum Committees were established to facilitate the training effort and to establish writing/reading, speaking and computing intensive course graduation requirements.
2. to help faculty revise their course syllabi to reflect the establishment of writing/reading, speaking and computing intensive courses in all curricula.

The Center thus offers a variety of faculty development workshops, presentations, teleconferences, and training workshops which focus on ways for faculty to use technology not only to facilitate their own research and writing endeavors, but to integrate instructional media and technology into their classroom presentations. (See pp. 18-19) Members of the Across the Curriculum Committees were paid from Title III funds for doing faculty trainings, and professors of the writing/reading, speaking and computing intensive courses were given a small stipend of $150 each for their first semester of participation which involved:

- attending training workshops
- teaching the intensive course(s)
- revising the course syllabus to reflect the criteria established for the intensive area(s).

The Computing Across the Curriculum Committee developed criteria for computer-intensive courses and held several training workshops with professors of the computer-intensive courses. A total of thirty- seven different faculty have offered different computer-emphasis course sections, impacting over 2000 students. All but two college departments have offered computer-intensive courses.

The syllabi of 18 courses in 13 departments were revised to reflect the criteria established by the Computing Across the Curriculum Committee as appropriate for computer-emphasis classes. These syllabi are now used for the sections of courses offered as computer- intensive.

Work is still in progress towards the goal to establish writing/reading, speaking and computing intensive course graduation requirements.

Specific efforts were made to upgrade computer resources in support of computer-assisted instruction. Computer labs for both students and faculty were upgraded. This assisted the college's efforts to increase the number of computers needed for a student population of nearly 17,000 and a full-time and part-time faculty population of approximately 1,000. There are three labs in constant use: an IBM lab and a MacIntosh lab for students, and a Resource Room containing both types of computers for faculty and staff.

The Teaching Center coordinator had 2/3 released time provided by the grant. The Teaching Center and the coordinator's position are now institutionalized; the college provides the funds for the coordinator's released time. In addition, a position was recently added for an adjunct co-coordinator with three hours of released time provided by the college. The yearly budget for the Teaching Center is now funded through the Office of Academic Affairs.

The college also recently established the position of Director of Institutional Technology. This person, working in collaboration with the Coordinator of the Teaching Center, assists in providing technical and training support for staff members. Both the Director of Institutional Technology and the Coordinator of the Teaching Center also work with the Computing Across the Curriculum Committee to provide technical and training support for faculty using technology in classes. The Director of Technology schedules computer-intensive courses in appropriate computer labs and makes sure instructors have adequate software.

THE PROGRAM CAN PROVIDE MEASURES OF SUCCESS: Evaluations.

Each semester, faculty of writing/reading, speaking and computing courses completed questionnaires evaluating their training and the helpfulness of writing/reading, speaking and computing activities. Student surveys, retention rates & pass rates for the computer-intensive courses were also examined.

As a result of computer-intensive courses, the technological skills of both the students and faculty have grown - and the demand for computers has increased. Additional computer lab space is now being planned for the college's "new" campus building, Fiterman Hall, which was donated in 1993.

All events sponsored by the Teaching Center, including computer workshops, are evaluated by the faculty and staff participants. The hands-on computer workshops are well received by participants, some of whom are computer illiterate when they

begin. As shown in the evaluation summaries, the workshops were positively rated in all aspects except time - the majority of participants felt that the workshops should have lasted longer.

THE PROGRAM COULD BE ADOPTED/ADAPTED BY OTHER COLLEGES.

BMCC has an extensive, well-organized program of faculty and staff development centered on the application of technology. In addition to helping faculty and staff who have limited experience in using computers, the program provides all faculty and staff members with opportunities to grow in their knowledge of technology through a wide variety of hands-on workshops.

More faculty members are using computers to facilitate their research and writing efforts and to make their teaching more proficient, effective, powerful and flexible. There is also an increased awareness of the future potentials of distance learning.

More staff members are also trained in the use of computer equipment which enhances both their job productivity and the efficiency of this large institution.

Instructional Computing Resource Center
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Although there has been much talk about "The Classroom of the Future," very few institutions have been able to actualize it. San Juan College, through its Instructional Computing Resource Center, is turning what would have only been a dream a few years ago into a reality. The ICRC operates a full-time, full-service, staff development program for faculty and provides the college with a framework for investigation into, experimentation with, and integration of technology into the classroom at the college.

Established in October 1992, the ICRC has already effected a fundamental change in the way teachers teach and students learn at San Juan College. The staff development program for faculty at San Juan College represents a fresh direction and uses multimedia computer technology to equip its faculty for the 21st century. During the faculty training program, faculty become students themselves as they learn how to utilize various types of computer technology. Faculty are trained to store, control, and present multimedia programs combining text, video, graphics, sound, and animation. They also learn how to use a computer to control interactive tutorial instruction in tandem with videodisc and CD-ROM players. The creation of a capacity for multimedia presentations is moving computer-assisted instruction from the lab setting, where it has been at home for many years, into the classrooms at San Juan College.

Virtually all of the faculty at the college are being affected by the activities of the ICRC. The ICRC employs two training tracks: a 256-clock-hour summer course and a 500-clock-hour academic year course. During the summer track, four faculty are

paid an hourly stipend to attend, and, during the academic year, five faculty receive 40% release time to participate in the program. Adjunct faculty are given a stipend to attend a 40-hour, one-week, intensive summer institute. Working through a systematic process which distributes training opportunities to the college's academic divisions equitably, the college has already trained a third of its full-time faculty. Once the process is complete, nearly all of the college's full-time faculty and a significant portion of its part-timers will receive the training in the "high-tech, high-touch" environment of the ICRC.

The cornerstone of the faculty computer training program is the staff of the Instructional Computing Resource Center. The Director of the ICRC is a veteran teacher who understands the tremendous impact of using technology in the classroom. She helps faculty realize that the terms "great teacher" and "competent technician" are not mutually exclusive. She is assisted by aides who are knowledgeable, available, and encouraging with faculty trainees. The equipment is second to none with state-of-the-art DOS and Macintosh computers, color printers, laserdisc and CD-ROM players, digital cameras, video projectors, LCD panels, scanners, and bar code readers.

The impact on curriculum and instruction has already been extensive. Technology in the classroom has improved access to resources, brought about effective and efficient delivery of instruction, addressed various student learning styles, enabled distance learning, and increased the interest of students. The primary teaching methodology of faculty is being transformed from the traditional "lecture and listen" to a more dynamic interactive process. As a result of the training, a faculty member becomes a facilitator of learning rather than the "fount of knowledge." The ICRC represents San Juan College's commitment to providing current technology, coordinating lesson planning, and producing multimedia presentations for use in the classroom. An outstanding example of a technological innovation spawned by the program is an American history class in which the textbook is a CD-ROM disc. Another example of particular interest is the development of vivid Navajo-language-based materials which promote greater cultural and ethnic awareness at the college and in the community.

An unexpected benefit of the use of technology in the classroom has been the overflow of its use in the computer laboratory setting. While the primary emphasis of the program has been on enabling faculty to enhance classroom presentations, the materials that they have developed have facilitated the creation of outstanding CAI tutorial materials. These materials, which are available to students at 250 computer stations on campus, provide for unlimited review, additional exploration, and in-depth investigation of subject matter for which class time alone is not sufficient.

Another beneficial aspect of the faculty development program at San Juan College is evident from the on-going change in teaching effectiveness and a sustained faculty commitment to professional development that is occurring at the college. After the training period, San Juan College faculty return to the classroom with a higher level of motivation and enthusiasm for teaching. New teaching methods utilizing multimedia and other technology have created an environment of excitement for faculty. Faculty are supported by the Instructional Computing Resource Center and its staff after they leave the training program. As new technology is brought on the campus, previous faculty trainees are invited back for "What's New" workshops and seminars. As faculty graduates of the program use technology in the classroom in

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innovative ways, they become facilitators to other members of their departments, causing an infusion of technology campus-wide.

There has also been evidence of three major effects of the faculty computer training program on student learning. By introducing technology into the learning environment, learning has become more student-centered and interactive. Computers and software in the classroom have contributed to student motivation, as well as an increase in student self-confidence, especially when the technology allows learners the ability to control their own learning. Greater student cooperation and collaboration have occurred when students have used technological innovations in working together toward accomplishment of course objectives.

The words of one of the college's long-time and highly respected faculty members probably best describe the impact of San Juan College's faculty development program. She said, "The best thing about this program is that I feel the college is investing in me!" San Juan College believes that this kind of investment yields the highest return.

SECTION V ENTRIES

Academic Computing Program
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The goals of the college-wide Academic Computing program are (1) to train faculty and staff in the basics of microcomputer operations, word processing, electronic mail, spreadsheets, and database management systems, (2) to provide classes and mentoring for faculty interested in integrating multimedia programming into the teaching/learning process, and (3) to train faculty and staff in the use of worldwide information services (SEFLIN, FREEnet, and INTERNET). These goals are achieved through a team approach that pulls together the creative energy and funding available at both the district level and the campus level and couples that effort with Title III funding support.

Leadership at the district level is provided by a Director of Academic Computing with over fifteen years experience in instructional technology. She is assisted by an Academic Computing Coordinator whose computer expertise and experience teaching art at the college level make him well-suited to assisting faculty with computer-based instructional design. A second Academic Computing Coordinator is currently being hired. Completing the academic computing teaching team are peer professors, BCC faculty who augment their regular teaching schedules with academic computing mini-courses.

During the 1994-95 fall term, the academic computing team offered 76 hours of instruction attended by 317 enrollees. Ten different mini-courses were offered in computer basics, including introductory and/or intermediate levels of such courses as DOS, Windows, Word Perfect, MS Works, and Lotus. Participants evaluated these courses very high -- 98% found the instruction valuable and 89% immediately concluded that they would be better able to do their jobs. Seven different multimedia mini-courses focused on overviews of hardware, demonstrations, and applications, such as hypercard, Powerpoint, and CORELDraw. Over 95% of the participants endorsed those courses as valuable. An introductory level telecommunications course focused on connecting to the SEFLIN FREENet. 2

These mini-courses are so highly regarded by the college that the president has approved them for internal professional development credit for both faculty and administrators. As a further reward for faculty, and to help them immediately apply what they have learned, the Academic Computing Department purchased 116 modems which were given to the full-time faculty who attended the telecommunications sessions last term. These modems have been put to good use. A North Campus biology professor reports: "I was looking for the latest information regarding food poisoning. With the modem and my FREEnet account, I was able to research the Library of Congress and find the latest articles. I also searched libraries around the country and found additional information and statistics. I used this information directly in my classes."

A Central Campus professor of English as a Second Language exclaims, "Now I am able to communicate with ESL faculty around the world!...I have received many teaching tips -- over 40 in the past week or so." This "Great Modem Giveaway" was so well-received that a follow-up "Great Software Giveaway" has already been publicized for the spring term. Software has been ordered to award to full-time faculty attendees at Powerpoint, Word Perfect, MS Word, and Aldus Persuasion training this term.

Although the Academic Computing Director and the Academic Computing Coordinator put a great deal of effort into teaching these mini-courses, that is not their sole contribution to increasing awareness of instructional technology at BCCC. They also assist the campus academic computing committees in the selection of hardware and software and work individually with faculty who have questions regarding software installation and usage and classroom applications of technology. In addition, the Academic Computing Department has scheduled teleconferences and sessions with consultants on topics such as multimedia, distance education, and Project Synergy.

Currently, one of the Academic Computing Director's main roles is to function as the Activity Director for a portion of the college's Title III initiative, now in its third year of funding. In this role thus far, she has assisted the campuses in the purchase of 51 computers for faculty use and 10 computers for student lab expansion, as well as numerous LCD panels, high intensity overhead projectors, and scanners, and has led the team that designed and installed the 24-station electronic classroom on the South Campus. When not occupied by students, that classroom will be used as a prime teaching venue for multimedia classes for faculty.

The Title III grant also provides two terms of reassigned time for twenty faculty (5 per year for 4 years) for the development of multimedia classroom applications. Creating formulas and graphs in Lotus 1-2-3, a tour of the college's performing arts complex, genetic engineering, radiographic equipment, and a writing review for business communications these topics, which provided the focus for the first five multimedia projects developed by Broward Community College faculty for classroom application, premiered in January 1995. Currently under development are units on ecosystems, demonstrating the multiplier, composition, animal physiology, and antibody function. Both the director and the coordinator work closely with these faculty in groups and one-on-one to provide direction for the development of their teaching modules.

In support of the mini-classes and faculty reassignments, subscriptions to a number of computing magazines, such as New Media, PC World, and MacWorld, have been ordered for each of the college's four teaching sites and are housed with the Teaching/Learning Center Collection at each location. Some travel money for off-site training is also available through Title III, but the bulk of travel to academic computing conferences and training sessions is financed through the college's Staff and Program Development (SPD) fund. Thus far this academic year, SPD has funded computer technology travel for a total of 10 faculty and staff to such events as TeleLearning Conference '94, Authorware Professional, Mac Survival Game, League for Innovation, MacAcademy Workshop, and Orlando Multimedia '95. In addition, the Academic Computing Department has sponsored a half- dozen faculty to attend advanced multimedia computer training at Miami-Dade Community College.

Computer Technology and MultiMedia In The Classroom

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Charles Hunt, management instructor at San Antonio College, uses the latest technology to create striking, innovative presentations for management students at San Antonio College. San Antonio College is a member of the Alamo Community College District (ACCD), located in San Antonio, Texas. The college's current enrollment is approximately 45,000, which includes over 21,000 full time students.

The district encourages the use of MultiMedia in the classroom. Mr. Hunt is one step ahead and is paving the road for others to follow. Although he doesn't have all of the required state of the art equipment needed, Hunt is determined in his quest to get to the right funding source to acquire the additional equipment, to make his job much easier and more professional.

Hunt brings together, on a computer, multiple types of media; text, illustra-tions, photos, sound, voice, animation, and motion video in his management lectures. His current lectures are created using a personal computer provided by the college; Story Board Live, projector panel, and an overhead projector, purchased with his own personal funds.

He has put together a list of equipment needed in order to make the job much easier which includes MultiMedia Studio, a software program by Advanced Media, Inc; computer hardware needed includes a 486DX175MHz or Pentium 90 Mhz processor, 810 MB hard drive, 8MB RAM, 64-bit PCI Local Bus Video, 3.5" floppy drive, Double-Speed CD-ROM drive (250ms), 16-bit Sound Blaster-Compatible sound card, Stereo speakers, AcerView 15" .28 non-interlaced color monitor, 101-key board and mouse, MS-DOS, and MS-Windows.

No stranger to technology, Hunt, a former executive for IBM, grew up with the Information Age. Employed with the computer giant for 13 years, he is persistent in his quest for excellence in everything he does, and sees Information Technology as the doorway to the future for students, as well as the college in general. Tying his knowledge of the industry, with the classroom lecture, Hunt creates distinctive charts, to enhance the textbook material for the junior college student. He feels that by using this method to paint a picture for the student, his lecture will stay with the student for a lifetime, rather than until test time, and then forgotten.

The success of the program can be clearly evidenced by the competency level of the students, and the ability of the student to apply this knowledge in the workplace. Hunt feels strongly that by using MultiMedia in the classroom in the ACCD, the district can achieve the level of competence and excellence that it is presently seeking, as part of the strategic plan, and bring the colleges within the district up to date on methods that are being used in many successful corporations, as well as government agencies. Hunt also measures the success of this program using several other criteria:

Student retention rate

The student retention rate provides evidence regarding the process and value of the program. Hunt has minimal drop outs since becoming a member of the faculty at San Antonio College.

Student examinations

Hunt's students have been able to score very well on quizzes and examinations. He contributes the high rate of success to the integration of MultiMedia into the classroom.

Class evaluations

Hunt has rated very high on his class evaluations.

This program can be used as a benchmark, and Hunt has offered to demonstrate it to other faculty members. Hunt believes that technology could help to facilitate the revision, updating, or development of classroom lectures in other departments as well. It will serve as an enhancement to faculty competencies and student outcomes.

Distance Learning Program
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Elgin Community College is a member of a Distance Learning Network operated by The Fox Valley Alliance which includes 13 colleges and institutions. ECC is connected through a Distance Learning Network to three other community colleges and two private colleges of the Fox Valley Alliance. The distance learning system provides two-way interactive instruction using compressed video technology over T 1 line hook-ups between the participating institutions .

The distance learning class format requires faculty to be trained in preparation, presentation and use of equipment. Member institutions recognize the time commitment of faculty to this process by providing a per diem stipend for training and an additional stipend for teaching the course on the system for the first time. After a year-and-a-half of involvement with the distance learning classroom, ECC has found that, in addition to allowing us to increase access to programs and to extend the breadth of our offerings, it has been an effective faculty development tool for the fifteen faculty who have taught on the system.

ECC, like many colleges and universities, faces the challenge of helping faculty to continue to grow and develop to meet the needs of an increasingly sophisticated student population. Today's students expect fresh course content and professional presentation and to be active participants in the learning process. Students also expect college classrooms to be as technologically wired as their homes and workplaces. Most faculty, however, were trained before most of these technologies

were invented. The development of a Distance Learning Program can provide a user-friendly mechanism to accomplish faculty training in technology utilization and to re-energize faculty. It allows faculty to develop new approaches to course material and to learn to use new equipment as they teach. As faculty use the system, they develop skills that also increase their effectiveness in the traditional classroom.

Interviews with faculty who teach on the system have identified the following benefits to their own professional growth, their courses, and their teaching:

1. **Increase in intellectual excitement.** As the distance learning instructor explores ways to use the new technologies in the classroom, he or she starts a process of reexamination of the course and the field, in general. The overhead graphics camera system in each classroom combined with the readily-available VCR opens up a wide range of possibilities for the inclusion of visual materials. Instructors who shift the focus of courses from the "talking head" to visuals report a new excitement for the course material. A second force in energizing the instructor is the need for lessons to be planned well in advance and presentations timed to fit a set schedule. These constraints force faculty to become more inventive in their presentations. Faculty carry these new approaches back to the traditional classroom.

2. **Return to the role of student.** Effective teaching requires one to be able to remember the student perspective. Teaching in the distance learning classroom makes the instructor a student again as he or she is trained. Faculty experience the anxiousness of a learner faced with the unknown as they train on the system. The reminder can help faculty to reconnect to students. Connection between the student and instructor is an important element in the facilitation of the learning process.

3. **Increase in student-faculty interaction.** Educational specialists are looking for ways to encourage students to be active learners and to develop the faculty to teach them. The distance learning classroom does both. Students report being more engaged and involved in the distance learning classroom than a traditional class. They must interrupt the professor to ask questions and faculty must get comfortable with this type of active student. With three sets of TV monitors in the classroom, students report that they "can not hide" from the instructor. They report that the visibility compels them to stay engaged in the class. The active role of the student continues as student questions and comments direct the camera movements in the classrooms and the classroom action. The distance learning instructor learns to encourage student interaction in the classroom and to use it as a teaching tool.

4. **Increase in ease with technology.** Getting technophobic faculty to embrace technology can seem like an impossible task. However, every faculty member has a dream course he or she would like to teach but may not be supported by enrollments at his or her institution. Pooled enrollment on the system allows the course to be taught and faculty become comfortable with technology as they teach. Ease with technology comes with exposure and successful experiences using equipment. An important feature of our distance learning system is that it allows a faculty member to work at the level he or she feels

comfortable. The instructor can introduce new components as he or she feels ready. Even though instructors that use the full capacity of the system will be the best presenters, less proficient instructors can still have a successful class. This user- friendliness allows even the most apprehensive instructor to benefit from teaching on the system. The instructors can take their new ease with the distance learning equipment(overhead projection systems, video-tape players, FAX machines) and trouble shooting skills into their traditional classrooms and offices.

The distance learning classroom provides an opportunity for a faculty-initiated developmental process. Many faculty want to become technologically proficient, but are reluctant for a variety of reasons to enroll in formal classes to gain the necessary skills. Developing a distance learning system can be part of a program to transition faculty into the new educational age when our students will be increasingly connected to us by technology and less by face-to-face contact. Those who have taught on a distance learning system will be ready for the "New College" constructed through the information highway.

Emerging Roles for Learning Assistance
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The Learning Lab or Tutoring Center located in a room full of tables and chairs is a thing of the past. The modern center includes VCR's, computer hardware and software, laser discs, CD's and multimedia set-ups. The role of the Learning Assistance Provider has changed from teaming up tutor and tutee to analyzing what equipment or services best remediate a student learning problem.

The link with faculty is more vital than ever for a successful program. If faculty do not send students to the center for help, the center will eventually die. Therefore, it seemed natural that if the learning assistance provider acts as a consultant to faculty, many important results can occur. First, faculty become aware of how technology can enhance their courses. They can be acquainted with methods of bringing technology into the classroom and with tools their students can use to enhance papers and projects. At the same time, a strong link forms between the Center and classroom, as learning center personnel teach both faculty and students how to use the Center's software through demonstrations in the classroom.

The role of the Learning Assistance Provider could include the following: introducing faculty and students to new software, CD's and laser discs available through catalogues and free demos, assisting with hardware orders, teaching faculty how to use everything from a mouse to a liquid crystal display and a laser disc player, visiting classes to present software that the students are expected to use, assisting both full and part-time faculty in how to interface technology with their lectures, and providing technical assistance.

There are several examples of how this type of cooperation helped both classroom instructors and learning assistance personnel at Edison Community College. A business writing course added the requirement of a computer-generated chart to a research assignment. The Learning Assistance Provider demonstrated two possible software packages students could use by wheeling a cart with the computer hooked to a LCD into the classroom. Later the students came to the lab to do the papers, and tutors helped them with both the technology and the writing.

The math department began using the TI-85 calculator in all math classes. The Center housed the equipment for adjuncts to demonstrate the calculator in the classroom. It also held workshops for students who needed help outside of class with the calculator. These workshops were held in the classroom and in the Center.

Of course, not everyone in learning assistance has the expertise to assist in technology, but they can still form a solid link with the faculty by going to classes and lecturing on study skills, by involving faculty in tutor selection and training, and by organizing learning groups for students in courses that are particularly difficult. The important thing is to keep the communication flowing between the two areas.

According to Dr. Carl Berger from the University of Michigan, there are four levels of computer use on the college campus: enhancing existing materials (more professional-looking overheads), using existing software, adapting existing software and discs, and creating original software. Learning assistance providers at Edison are attempting to take faculty from level one to level four. That way materials that come free with textbook orders or that faculty create themselves can be used in the classroom, as well as the Center.

Another way to look at the technology is that it can be used as a teacher, as in drill and practice, or as a tool to produce a better product. Students need to look at the technology as a tool to generate higher quality output more quickly. Drill and practice has its place in education, but is not the most important use of technology.

There are many pitfalls in dealing with technology. The decision of what to buy in the way of technology for a Center involves high cost and the rapid obsolescence of both hardware and software. In addition, security is an issue because, as computers and auxiliary equipment shrink in size, it is more difficult to secure them. Learning center personnel have to be aware of legal issues and able to communicate what is ethical to faculty and students.

Many outcomes can be examined to determine the value of a learning center using technology to reach out to faculty or even to measure success of establishing a linkage between the Center and the classroom. Monitoring student usage of the Center is one measure and monitoring the number of faculty who begin to use technology with their courses is another. Reviewing the requirements in the syllabi would be one way of establishing the use of technology in the course. One could examine written assignments, class projects, and other outcomes to see if they are enhanced by the use of technology. Trying to determine whether student learning is increased because of use of the Center or the use of technology in the classroom is a bit more complex. Technology increases the auditory, visual and tactual channels of learning. Instructors could be surveyed to see if classroom time is used more efficiently with technology, while students could be surveyed to see if they perceive more learning taking place.

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The link between classroom and Learning Center has been established at Edison College. The benefits of communication are observable. As technology continues to become more powerful and change more quickly, learning lab personnel will be racing to keep up with it.

Faculty Development
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Montgomery College has as one of its goals, the professional development of faculty to meet the changing needs of students in a world of high technology.

The administration believes that one of the best ways to accomplish this goal is to enable faculty to generate their own strategies for identifying, planning and executing programs to upgrade and strengthen their education and skills in educational technology.

To this end, at the Germantown Campus, a professor who teaches Computer Science/ Computer Applications in the Division of Science, Mathematics and Technology volunteered to review the latest literature related to dynamic new technology, attend seminars and workshops related to this technology, and provide direction and recommendations regarding these endeavors to interested peers, and to administration.

As a result of the professor's investigations and recommendations, she was given release time to establish a faculty development program in computer technology, especially related to use in the classroom.

The first series of workshops were so successful that the professor sought other alternatives to provide what was becoming a continuing demand for more and varied training at different levels of difficulty.

Consequently, an alternative training proposal was submitted to the Deans of Science, Mathematics and Technology and Humanities and Social Sciences, respectively. The proposal involved the selection of a team of professors who would receive some release time to be educated and trained in the use of different software programs. In return, these professors would provide on-going seminars on software programs and equipment on which they had become proficient. The constituency of the team include: a chemistry professor, a business administration/computer science and computer applications professor, a biology professor, an English professor, and a humanities professor. Team members offer their seminars at varying times to accommodate different teaching schedules. Response has been overwhelming, and the enthusiasm generated by the team approach has prompted similar approaches in other areas of faculty development. Often the team members offer their workshops in conjunction with the Division of Continuing Education and

Distance Learning which has the college-wide responsibility for some faculty development training.

The team members keep abreast of emerging technology and software programs and provide suggestions and recommendations for training, as well as the incorporation of the new information into the curricula structure, i.e, a credit course on the use of the Internet.

The success of the program is the result of sincere team effort, the faculty's willingness to take responsibility for their ongoing professional development, and administration's strong belief in and support for empowering and enabling faculty to provide all students with the educational technology skills necessary to be informed critical thinkers, astute decision-makers, and contributing citizens of the world.

Faculty Development in Technology, Staff Development
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The Technical College of the Lowcountry (TCL has an annual Faculty Staff Planning Retreat as a part of its institutional effectiveness planning process. Two concerns voiced by faculty, staff, and administration centered on the need for computer training and for access to professional development opportunities. An informal needs assessment revealed computer training needs ranging from how to turn the computer on to basic wordprocessing to database and spreadsheet applications, as well as how to use the VAX, e-mail, and the Internet.

A member of the Computer Technology faculty and the Department Head for Business hit upon a simple, yet doable solution - use our in-house expertise to develop a course designed to meet the expressed needs. The course to be taught by the faculty in the labs on campus was designed to use the hardware and software available on campus.

The Department Heads of each academic department recognized the value in such training and the wide range of expertise among the department faculty. To begin to meet the goal of effective use of technology in the teaching/learning setting, the department heads encouraged faculty to include an objective in the Faculty Performance Maintenance System (FPMS) concerning improvement of computer skills.

Actually, the results have been impressive. A series of professional development courses are offered ranging from a six week, twelve hour course on Windows as an operating environment to a series of two week, six hour courses on the VAX and e-mail, Internet, spreadsheets and database. Each meets on Friday mornings and any employee of the College can attend. The anticipated enrollment was underpredicted and we are currently offering the Windows class and also the VAX and Internet training sessions for the fourth time! Approximately 50% of the full

time faculty, staff, and administration of the College have earned certificates in one or more of these short professional development courses.

This type of approach to providing valuable structured professional development activity has been very beneficial. First, there is the obvious improvement in participant's computer skills and the resulting curiosity to learn more about what technology can do "for me." Secondly, there is a sense of pride resulting from the use of TCL's own "experts." The computer technology faculty and information resource management personnel who developed and instruct the courses are valuable resources for all TCL personnel. In addition, the opportunity to share this learning experience with others from across campus emphasizes a unity in mission though each individual has a unique role on campus.

Faculty Multimedia Training and Development: A Catalyst For Change

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Based on the premise that the human resource is truly the most valuable resource at any institution, Brevard Community College (BCC, has long offered a comprehensive program of Staff and Program Development (S&PD). The college provides faculty members with numerous opportunities to continue their professional growth and development through project grant awards, extended professional leave, tuition reimbursements, on-campus workshops and graduate courses, and Faculty Return to Industry.

The appeal and utility of multimedia in education is broadly based and rapidly growing. In response to an awareness of varied student learning styles, BCC faculty are encouraged to use multimedia and other audio/visual methods within the classroom and in computer-assisted instruction labs to increase the rate of student success. As more of our college population becomes accustomed to receiving and processing information combining graphic color images, animation, and dramatic sound effects, faculty are increasingly challenged to integrate these components into their instructional repertoires. However, the ultimate need prompting BCC to plan for multimedia development is the urgency of increasing efficiency and productivity in use of all resources. Multimedia offers great potential for supporting more flexible course structures, enhancing instructional delivery, and widening the range of learning tools and methods available to all students.

In response to these needs, BCC established a faculty/staff multimedia development lab and a planned program to motivate, train, and support faculty development of multimedia software.

The original faculty/staff multimedia development lab was established in Fall 1993 with only two personal computers, using presentation software packages costing under $100. Major investment in equipment and software and the enthusiastic user response required relocation of the lab to larger quarters in early 1994. The 450

square foot lab now houses multimedia personal computers, scanners, laser disc player, video and sound editing equipment, and a full array of authoring, graphics, animation, and presentation software.

Dr. David Oscarson, Professor of Technologies and Multimedia, is awarded release time from one class per term (Fall and Spring) to provide training and continuing technical support to participating faculty. In addition, five faculty per academic year are selected as program fellows and paid a nominal stipend. Each fellow agrees to produce an operational multimedia program to supplement and support instructional delivery in his/her specific course. Monthly meetings are held with fellows to discuss progress and exchange ideas. Each year this generates five additional faculty who are willing to help colleagues "get started" in multimedia and are committed to improving their own projects and finding new opportunities for applying multimedia techniques.

An important aspect of the program is the systematic offering of on-campus intensive training workshops for program fellows as well as other faculty participants. These competency-based workshops are designed and facilitated by Dr. Oscarson and are offered each Fall and Spring term. As an added incentive to faculty, because each workshop meets for a minimum of 15 contact hours and requires a product outcome, one semester hour of graduate credit is arranged through agreement with Florida International University.

The faculty multimedia training and development program is now in its second year. To date, various training workshops have been offered to faculty in order to acquaint them with subjects ranging from multimedia basics to working with multimedia presentation software. More than 70 of the 235 full-time faculty have successfully completed the 15-hour workshops. As reflected in the "Participant Feedback Forms," faculty indicated that the workshops were "excellent," "extremely valuable," and that the experience has "added a new dimension to my presentation skills."

Another measure of success is the quality and diversity of the multimedia presentations created by the project fellows. During the first year, five operational multimedia courseware packages were designed for classroom use in disciplines ranging from Astronomy and Introduction to Computers to Art History and Fashion Merchandising. Courseware packages in development during FY 94-95 include Mathematics, Sociology, Chemistry, and Drafting and Design Technology.

Perhaps the greatest measure of success is the spirit of innovation the program has kindled among the faculty. Summed up in the words of one faculty fellow, "I think of multimedia development as a chance to compete with technology. Experimenting with the various possibilities of multimedia in the classroom (and with the students) says you are a medal winner. Multimedia is here to stay....Yes, it is developing far faster than we can ever keep up, but you have to challenge yourself and start somewhere."

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Integrating Information Technologies

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Pensacola Junior College is implementing a multi-faceted approach to integrate information technologies at the district level. The purpose of the projects are to strengthen the utilization of technology, support contemporary standards and future applications in academic and administrative computing and educational telecommunications. The main components of the plan are the District Wide Area Network (DWAN), Faculty Resource Center (FRC), Multimedia Application Program (MAP), Staff Development and In-service Training, (SDIT), Academic Advising Program (MP), and MathLine.

The District Wide Area Network, (DWAN), connects each building on the three main campuses to the fiber optic backbone. Currently 280 computers and 7 buildings are connected on the Pensacola campus, 15 computers and 2 buildings on the Warrington campus and 35 computers in 3 buildings on the Milton campus. The DWAN provides faculty and staff with access to: the INTERNET, campus Main-frame, e-mail, services and resources available through the Faculty Resource Center and Learning Resources Center, (LRC).

The Faculty Resource Center and mini-centers provide faculty and staff access to equipment and training to assist in the design, development, evaluation, and integration of instructional technologies across the curriculum. The FRC is the main site for workshop offerings on information and instructional technologies utilizing microcomputers. The mini-centers are located in the LRC on the Warrington campus and at two sites on the Pensacola campus. The mini-centers provide faculty with easy access to computers, peripherals and applications.

The Multimedia Application Program, (MAP), is designed to enhance the teaching and learning process through the use of computers by faculty, staff and students. MAP provides students with access to multimedia courseware selected or developed by faculty for use in their courses. The project provides faculty a computer, software, and assistance in the selection, design development, integration and evaluation of courseware.

Goals of the Multimedia Application Program include:

- promote the use of technology by faculty, staff and students;
- provide training in the use of computer applications and academic software in their courses;
- demonstrations of academic uses of multimedia technology using off-the-shelf courseware and courseware developed by faculty;
- resources for the evaluation, design, development, integration and evaluation of computers across the curricula.

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MAP is available to all full-time faculty members; novices, intermediate, and advanced computer users. Workshops individual sessions, group course offerings, and development computers are available for all computer skill levels.
MAP proposals are reviewed, ranked, and selected for approval by a committee. The committee considers the following in reviewing the projects:

- Impact of the proposal on the student use of computers
- Duration of the project
- Feasibility
- Cost

The goal of professional development is for each participant to take the initiative in planning for and engaging in ongoing professional development activities. All faculty and administrators complete and report professional development activities on a five- year cycle. To aid in this process, the Staff Development and In-service Training, (SDIT), department provides a mechanism for assigning credit, scheduling, and evaluation of workshops, seminars, and courses for faculty and staff. Over the last three years the PJC staff have participated in approximately three hundred (300) computer related workshops presented by the SDIT Department. This computes into six hundred clock hours of actual hands-on computer activities. Topics have included; microcomputer basics, operating systems, word processing, spreadsheets, databases, authoring systems, graphics packages, e-mail, Internet, other on-line resources, special topics for advanced users, design and development of; computer based training, computer assisted presentations and instruction.

The Academic Advising Program, (AAP), provides faculty with hardware and software for on-line access to student records for advising purposes. The faculty advisors participate in six (6), two hour training sessions where they review academic policy, student records, and program requirements. By the end of the training faculty advisors are able to register and drop/add courses from the computer in their office. The Academic Advising Program enables faculty members to use their academic expertise to equip the student with informed choices, reduce the number of students in the registration area. The MP allows faculty members to participate in the registration process and use the computer for other applications. PJC currently has seventy-seven or about 31% faculty participation in the Academic Advising Program. Additionally, the training program includes department heads and program directors (grants, etc) who choose to participate; however, their computers are purchased from a different source. In this category PJC has forty-three trained advisors.

MathLine is offered through WSRE, Pensacola Junior College's PBS television station. Mathline provides K-12 Math instructors in the area online access to other participants at a national level. Through MathLine, participating Florida panhandle instructors can electronically discuss and share: lesson plans, observations, strategies, tips, techniques, communications associated with teaching and learning topics originating through MathLine.

MathLine participants receive:

- twenty-five videos of real classroom teachers teaching National Council of Teachers of Mathematics, (NCTM), Standards based lessons;

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- live national videoconferences;
- membership in an on-line learning community;
- year-long professional development program Teachers gain;
- a clearer understanding of the NCTM Standards;
- a network of professional support;
- professional experience using distance education and telecommunications

Of the twenty PBS sites selected for MathLine, PJC's participation level is the highest in the nation.

LET'S TALK TEACHING: AN INTERNAL PROFESSIONAL DEVELOPMENT PROGRAM
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The Let's Talk Teaching Program was established in 1990 as a professional development program for faculty and staff on the South Campus of the Community College of Allegheny County. The Program is designed to address the challenge of regenerating the interest of seasoned professionals and involving new faculty and administrators in considering, in a structured fashion, contemporary educational issues. The Let's Talk Teaching Program focuses on the enhancement of the skills of faculty and staff as the college environment shifts from being authoritarian and teacher centered to participative and learner centered. Specifically, the strategy for the Program consists of:

- Maintenance of the direction of the Program by a planning group known as the Let's Talk Teaching Planning Group with the membership consisting of both tenured and non-tenured full-time faculty members, part-time faculty, and an administrator.
- Conducting of a variety of workshops through which faculty members give presentations on such topics as Gender in the Classroom, Multiculturalism, Technology in the Curriculum, Critical Thinking, Student Assessment, Use of Multimedia, Active Learning, Meeting the Needs of Students with Various Learning Styles, and Educational Outcomes.
- Inclusion of a professional development component in the annual full and part- time faculty orientation programs with the presentations being presented by members of the Campus community.

- Development of the monthly Let's Talk Teaching Newsletter through which faculty dialogue on educational issues often related to topics discussed at the Let's Talk teaching presentations.
- Creation of a video library showcasing the professional development programs as presented by the faculty.
- A formal recognition system for individuals who have made major contributions to the Program through the presentation of programs or by contributions to the Newsletter.

The Let's Talk Teaching Program goes beyond conventional professional development programs in that rather than employing educational consultants for presentation the majority of the formal presentations are by Campus faculty. Without extra compensation, the faculty volunteer to conduct their own research, develop materials that often include the production of video tapes or multi-media presentations, conduct the formal programs, and/or prepare publications for the Newsletter.

All of the formal presentations are evaluated immediately following the programs by members of the Planning Group reviewing the assessment forms completed by participants and discussing any needs for modification in format or topics for future presentations. Periodically, all aspects of the program are evaluated through a survey that is administered via the Newsletter, which is distributed to every full and part-time faculty and administrator on the Campus. Through these assessments, topics for future presentations and publications are determined, the length and frequency of programs considered, and the value of the Newsletter determined. Aspects of the Program have been modified after each assessment in order to retain the viability of the Program and the interest of the Campus community.

Multimedia for Faculty
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As the information highway paves its way ever more prominently into our lives, both public and private, the responsibility of educational institutions to acknowledge and benefit from new technology becomes ever more important. At a time when many educators lack experience with technology that develops and changes very rapidly, we must be aggressive in our desire to exploit innovative and exciting teaching opportunities that new technology can provide. To do this we must first educate ourselves.

It was with these rising issues in mind that Dr. Lisa Stokes began an extensive study into the possibilities of helping to bring Seminole Community College to the forefront in the use of current technology for education. Dr. Stokes reviewed research that demonstrated that if an instructor can provide visual and aural stimulation to students, the students learn faster, retain more, and find the material

easier to learn. Data also showed that multimedia learners experience a 10-20% improvement in performance over conventional teaching and learning. In addition on-task time is reduced by one third. (Molnar 1990).

Dr. Stokes began to formulate a program which would introduce the use of multi-media technology to S.C.C. educators and students. Dr. Stokes, with the training and assistance of Media Services Director Mike Simpson, began learning everything that was needed to design multi-media instructional materials. With funding supplied by the S.C.C. Staff and Program Development project, the Library and the Humanities Department, Dr. Stokes enrolled in a five day training program at the Institute for Academic Training at Durham, North Carolina. Upon her return Dr. Stokes began working with "Toolbook" a computer software program for designing lessons and tailoring them to individual needs. She expanded her own knowledge by using "Mastering Multi-Media," which enabled her to use the equipment to learn the equipment.

Now Dr. Stokes was ready to apply her new knowledge and technology to the classroom in her Humanities course work. At the beginning of the term students were introduced to the equipment and the lessons at work stations located in the library. At least twelve lengthy programs was created, plus a dozen shorter ones for class use. A wide range of programs was developed, from an introduction to visual arts, to an analysis of Hamlet and Rosencrantz and Guildenstern are Dead For example, the film Blade Runner and the novel Neuromancer are used to introduce Post-Modern Theory & Culture, a major component in a Contemporary Humanities class. After watching the film and reading the novel, students begin work with the multi-media materials. The program format included a movie documentary, concept exploration, hypertext questions, individual frames of works, commentary and music. This exercise is an effective method to direct a student to engage the multiple senses in reading, viewing, listening, writing, and responding. It is Dr. Stokes' conviction that multiple sensory learning solidifies the content and provides more in-depth study.

Students are asked to critique other students' work which is on the system. At the end of the term students write a one thousand word evaluation. In it they are asked to describe their computer experience, the level of difficulty of the program, and to give suggestions for the improvement of the lessons. For the most part, Dr. Stokes' students have been pleased with the ease of use and with themselves for learning a new technology in addition to the standard content of the course.

When student learning in her classes was quickened and enriched by the use of the first lessons designed, Dr. Stokes was ready to share and encourage the new medium with her colleagues. Armed with her new knowledge and a chance to bring an exciting and innovative new teaching technique into the classroom, Dr. Stokes and Mike Simpson offered introductory workshops to teach faculty the basic technology, so they could design their own course specific programs.

The primary objective of the workshop is to teach faculty how to use the technology to develop their own programs. Faculty participants learned how to repurpose a laser disk, make clips, and edit video and audio clips. Dr. Stokes conducted these teacher training sessions while maintaining her regular teaching load of fifteen hours per week.

Dr. Stokes and Mike Simpson offered Multi-media Workshops during the fall, spring and summer terms for introductory and advanced multi-media training. The series included forty registered faculty and staff. More than thirty participants completed the workshops, and most of those unable to finish expressed continued interest and wanted to register for future workshops. Ten participants completed advanced training and six participants started using multimedia training during the summer term. In addition faculty graduates of the first workshops are now working with other faculty members in their departments to acquaint them with the multi-media equipment and conducting additional workshops which Dr. Stokes continues to supervise.

The workshops resulted in the establishment of a small multimedia resource area where faculty can use the multimedia equipment and where catalogs and resource guides have been collected for their use. Two work station centers were also created, one for students and one for faculty. A multimedia teleconference was held during the fall of 1993 with over seventy faculty and staff members attending. Nearly 1000 students have used multimedia instruction this school year and student and faculty evaluations alike continue to report overwhelmingly positive and enthusiastic support for the programs.

Beginning as an instructor who was admittedly computer illiterate, Dr. Stokes has enriched the teaching and learning experience at S.C.C. by sharing with faculty and students a new approach to course work. Dr. Stokes took newfound skills in technology and made a significant impact on the professional development of faculty. Technology has been incorporated in the classroom at S.C.C. because of the untiring efforts of one very committed faculty member, Dr. Lisa Stokes.

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Program is innovative and creative:

To keep Sierra College close to the cutting edge of technology, we developed a project funded by staff development, the district, and the telecommunications project to support a faculty member in the development of multimedia instructional packages to be used in the classroom.

The groups did a call for proposals inviting people to submit a plan for meeting the criteria. The person had to meet the following requirements.

1. be reassigned for one semester from all classroom and committee assignments
2. be willing to write materials for a series of 10 classroom presentations
3. be a person from a discipline other than computer science

4. have a good background in the use of computers
5. be committed to use the series in a designated class(es)
6. make a formal presentation of the series to all staff
7. serve as a resource person for others wanting to author media for the classroom at the conclusion of the reassignment
8. be able to choose his/her own platform of delivery (equipment/software) but be reminded that we already have made an investment in ToolBook and IBM multimedia equipment
9. be provided a private office away from the flow of student traffic
10. be supported to attend conferences to research the latest materials and learn the software
11. research how the system and materials can interface with the compressed video system and television

Pam Johnson was chosen to be the multimedia pioneer. She worked with a group of 16 students for a semester collaboratively learning the multimedia programs. She and the students became a production team, producing interactive multimedia for instructional use in the college's art program.

The work produced has been displayed at Sierra College Board meetings and to the staff as a whole on an opening day for the semester.

The products are works of art as well as interactive learning programs.

The multimedia program on Color Theory is now used in the Art 6C course. It incorporates several layers of interaction to guide the student through the various aspects of the theory. The creation involved authoring seven different Macromedia Director "movies," which were then put together into one interactive presentation.

The students and the instructor continue to work on another project even though the grant has been completed. "2DEEP" is a work on perspective that will eventually be used as a classroom presentation in drawing classes as well as individual student use.

This project was chosen over the three other applications because of the incorporation of students in the project. In addition to developing multimedia in the classroom, the students have assisted in developing something that is relevant to them as learners.

Benefits to the Student/Measures of Success

Because the project incorporated students in the development stages, the product is a unique blend of using the instructor's knowledge and the students' knowledge to develop something that works for the students.

The students gained in many ways. Everyone had to work as a team to produce something for direct classroom use. They had to research the topics, create artwork and text, analyze the learning/teaching process, verify content, deal with issues of copyright and plagiarism. With the weekly meetings, they learned to meet timelines,

identify the tasks to be performed, plan a work schedule, and make a commitment to complete the assigned tasks between meetings.

Two students involved in the project were offered jobs as an outcome of the work they did on the project. Several students have transferred to four-year colleges to major in graphic design and media production.

Students have begun development of a proposal for developing multimedia for a local museum.

Multimedia projects are being incorporated into the art curriculum.

Program could be adopted/adapted by other colleges.

This program could be easily adapted by any institution. All it takes is the commitment of the college to grant a creative individual the time and the tools to develop materials appropriate for his/her discipline. We would be happy to give them the procedure for announcing the process and an outline of the project as it evolved.

Strategic Planning for Computer Utilization--An Institutional Approach

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Waubonsee Community College is implementing a number of new technologies which will have a great impact on teaching, managing and administering the institution, in providing quality to all residents. To provide quality educational training in most disciplines, a plan was developed to provide for the strategic direction necessary to keep the college in step with technology and to take advantage of future advancements. Computing technology is a fundamental element in the instructional process and a plan has been developed and implemented to improve instruction.

In 1992, Waubonsee Community College made a commitment to a more effective and efficient use of computer technology on campus for both students and faculty. This commitment was implemented and includes development of a strategic five-year plan for institutional computing; inclusion of the entire faculty so they will have a network computer at their work stations; a staff development plan, including the hiring of a full- time specialist to work with faculty and staff through in-service activities; and constructing and equipping a new academic computer facility.

Develop an Institutional Computing Strategic Five-Year Plan

The rate of change of technology will greatly increase, and will re-engineer or reshape education as we know it today. We must plan for constant change, and in effect be change agents. Success with technology will force better teamwork and blur

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departmental lines. Computers and technology in the future will become so integrated in the college and the community that they will be taken for granted.

Therefore, a five-year institutional strategic plan was created to provide direction for the quality and the types of innovative computing technology necessary for the college, at the most effective cost, and in agreement with institutional goals.

In addition, two standing committees were created. The computing committee, which provides direction to the college's computing needs and the communications committee, which is designed to improve coordination among information systems, distance learning and institutional communications systems.

Include All Faculty So They Will Have a Network Computer at Their Work Stations

In the plan, all faculty who request computers will have a networked work station installed in their offices. These computers are being phased-in over a three-year period. It is intended that access to computers in the office will enable faculty to utilize existing networks both on and off campus.

Development of a Staff Development Plan Which Includes the Hiring of a Full- Time Specialist to Work with Faculty and Staff through In-Service Activities

The computer technology trainer was hired for all computing technology training within the institution, including faculty, support staff and administrators. The trainer's basic duties and responsibilities are to provide training on the proper utilization of computer hardware and software; develop and coordinate training on accessing computer systems and networks; provide individual, class and video computing technology training; coordinate a computing technology orientation for all new employees; and manage training for the administrative systems.

During the fall semester 1994, 11 workshops were held involving 20 sessions, on the following topics: Navigating the Waubonsee Academic Network; Microsoft Mail; Microsoft Windows; Meeting the Computer; Introduction to Microsoft Mail; Introduction to PowerPoint; One-on-Ones's (offered twice); Introduction to Windows; Using Tabs and Columns in WordPerfect 5.1 and WordPerfect Windows 5.2; and, Lotus 1-2-3 v 2.4, and The Basics.

Constructing and equipping a New Computer Facility

From conception to occupation, the new academic center took three years, including a considerable amount of time spent on research and review before the ideas were formulated. As computer technology became ever more necessary in the classroom, Waubonsee had slowly added computers until 19 small computer labs were located in several places on the Aurora and Sugar Grove campuses. It was difficult to service all the stations and to keep operations running smoothly. This led the college to the realization that one computer center was needed. Studies were done by the administration and the staff and a Waubonsee team visited four other community colleges to evaluate what those institutions had developed to meet their institutional computer needs. After accumulating the necessary information, a plan was developed to construct an academic computing center.

In the fall 1994 semester, classes began in the Henning Academic Computing Center located at the main campus. More than 125 credit courses, community

education and corporate development and training classes were held in the center during the fall semester.

There are eight classrooms equipped with 24 computer work stations each. The open lab features 120 work stations and all the computers in the center are networked to provide access to a wide range of software packages, as well as laser printers. Several of the classrooms are equipped with a Robotel switching system. This system enables the class instructor to demonstrate on each of the students' computers and simultaneously monitor all the students' individual computer screens without having to walk around the entire classroom. All computers in the classrooms and the open lab are integrated into the campus' information systems network, which is connected via an advanced fiber optic backbone.

This computer laboratory is state-of-the-art for education or corporate training. In addition, a distance learning classroom is being equipped in the center to facilitate sharing computer classes with 4 other community colleges, 5 high schools and 3 universities.

Summary

Waubonsee Community College has developed a five-year strategic plan for computing technology with the assistance of faculty, staff and the business community. This plan has enabled placement of computers in faculty offices, as well as a new state-of-the-art computer laboratory, which provides Waubonsee students with an effective, efficient and quality learning environment. Ultimately, this plan provides a foundation for future technological expansion.

Teaching With Technology: Faculty Seminar
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The Teaching with Technology Seminar is a year-long class designed to encourage Oakton Community College's faculty members to learn computer technology and to use it for teaching as well as course preparation and assessment. First offered in calendar year 1991 and repeated in 1992 and 1994, the Seminar is likely to be offered annually for the foreseeable future. Many of Oakton's faculty members had already become computer users before the Seminar was offered, but almost always simply to use word processing for their syllabi, exams, and assignments--which is a little like using a Porsche only to go to the supermarket down the block. Many remember too clearly the early stress involved just in learning to use the computer. They are not eager to risk bringing a computer into a classroom or working with an entire class in a computer lab. On the other hand, they keep hearing that more and better teaching materials are being produced, and they are increasingly curious about what they and their students can gain from computer technology. The Teaching with Technology Seminar guides them tenderly through a full year of learning and exploring.

The Seminar was designed and is taught by Thelma Parker, a counselor who is also the College's Faculty Coordinator of Instructional Computing, and Laura Saret, Professor of Computer Information Systems and Faculty Coordinator of Staff Development. Its first semester, in the spring, is an advanced computer literacy course for educators. It introduces computer applications and equipment, from word processing, spreadsheeting, database, and presentation graphics packages, as well as test generators and authoring systems, to modems, scanners, multimedia, and optical disks--and the internet. It also deals with such concerns as software evaluation, legal/ethical issues, and arrangement of the computer classroom. Participants are required to complete homework assignments involving exercises on several common types of software and equipment and to conduct a survey of the literature to learn what is being done with computers in their own disciplines. They are encouraged to sign up for additional training sessions arranged by the instructional technology program and to work with faculty consultants in small-group or individual sessions on particular software or equipment.

In the fall semester the Seminar requires each participant to incorporate technology into at least one course. Class members work collaboratively, consulting with one another as well as with campus experts on such matters as instructional design, learning theory applications, and visual design, then test the projects in their classes and assess their effectiveness.

While we continue to offer a variety of other kinds of in-service training for those wanting to develop computer expertise, the year-long Seminar remains the method of choice for breadth and depth. A seminar by its nature gets participants deeply and actively involved in studying the topic, provides them ample opportunities for serious research, and engages them in developing practical applications of the material to the work in the classroom. A seminar inevitably creates a community of committed faculty members, a circle of common interest, in which the best kind of learning takes place.

Thus we are pleased that the Technology Seminar has filled each year it has been offered and that it's raising the faculty's level of interest in exploring technology as a way of improving the way they teach and their students learn. The forty-seven participants to date, all full-time faculty members, represent eleven baccalaureate and vocational disciplines. With its emphasis on classroom applications and peer interaction and support, the Seminar has helped them make the leap from using the computer for word processing to considering--and trying--ways the computer can change how they teach. Students in English and journalism classes get assistance in generating and developing ideas through on-line conferencing, a feature of Daedalus software; art history students examine major works of art using the National Gallery laserdisk, while students in English as a second language classes write descriptive papers based on the same software; math students explore advanced concepts and practice with real-world examples using such programs as Derive and Minitab; allied health students use interactive software to develop skills in dealing with clinical situations. Many faculty members are using PowerPoint to support their lectures, while many more are signing onto the Internet.

The two Seminar classes are adaptations of actual Oakton courses and, for the instructors, they count as courses in their teaching load. Participants who complete all the work of the Seminar (virtually every one so far) can choose between using the courses for salary lane advancement credits or receiving payment for one credit of overload. Primarily, these incentives serve as a signal that the College has placed a

very high priority on the exploration of academic applications for computers and is ready to provide active support for those willing to begin the process.

The single major caution for a college planning to implement a similar program has to do with equipment and software. Since the Seminar stimulates faculty interest and converts doubters to users, participants' expectations rise and, generally, they want the necessary equipment to be available, readily, conveniently, and preferably for their exclusive use at home or in their offices. Like most colleges, Oakton has been able to provide that high level of support only gradually, over a period of several years. Since this situation represents long-term reality for most of us, both instructors and participants in such seminars need to be cautioned to work and to imagine within the limits that the college can support.

Technology Training for Faculty: Breaking Down the Barriers
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Santa Fe Community College (SFCC) in Santa Fe New Mexico has been implementing professional development strategies to introduce faculty to the use of instructional technology and to support their use of a new "technological" classroom. These strategies were based on a conscious effort to provide a non-threatening, supportive climate that encourages faculty to overcome fears while exploring technology possibilities.

An important initial planning step at SFCC involved the appointment of a technology planning committee to advise on faculty training, with ex-officio membership for the director of staff and organizational development and the director of information services. This committee conducted a campus-wide assessment to determine current levels of technology literacy and to identify faculty interests. Based on this information, the committee developed a technology training model that broadly outlined a three-stage training format to guide faculty development planning.

Initially the committee and the staff development office wanted to address two main reasons behind faculty skepticism: the fear that technology might dehumanize the teaching experience; and the belief that learning to use technology effectively is too difficult for the "non-techie." Opportunities to see technology used as an effective supplement to teaching were provided, such as a demonstration of on-line testing, interactive video, and a student learning styles assessment, as well as using LCD panels. This helped to break down some initial resistance. Knowing that some faculty were skeptical about the value of technology in teaching and that they believed it could undermine their teaching role, we also conducted a campus tour to take faculty to a variety of teaching sites where technology is being used. Faculty were introduced to applications of computers in physics (data collection, analysis, and physics simulation), a demonstration of a biology science laser disk, and a demonstration of computer uses for self-paced instruction. Faculty saw first-hand that student contact time can be enhanced rather than diminished by technology

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application. Training opportunities provided were simple, short, experiential, and manageable opportunities for faculty new to technology to learn initial skills.

It helped that SFCC had a history of using technology in some classes and labs, like computer tutorials in our Flex Lab. Also, over several years, a variety of technology demonstrations were brought to campus including IBM and Josten's programs. We organized training opportunities that were conducted by faculty peers who were comfortable with technology and could model its effective use in small groups. Faculty were given opportunities to use software that promotes collaborative decision making, to watch computer-assisted instruction offered across campus, to use Toolbook, Internet, Online Public Access (OPAC), and to experience interactive multi- media programs on CD-ROM.

Santa Fe Community College recently built two high-tech "smart" classrooms, equipped with state of-the art technology for faculty use. Faculty were involved in the design of the classroom and the equipment ordering. Now that these classrooms are available, we have begun the initial training of faculty to use the space and equipment effectively. A soundproof glass window was installed in the back of one "smart" classroom in order to provide a viewing space for faculty being trained in technology teaching opportunities. Faculty can be brought to this connected room to watch a class in action, without disturbing the class, and with microphone access to hear the class as it is being viewed. We anticipate that this demonstration classroom will increase faculty awareness of technology opportunities, reduce fears of faculty displacement in their teaching role, and promote enthusiasm for the new possibilities offered through technology.

This spring the annual, all-day planning retreat for the Instructional Division will be dedicated to additional training for faculty and staff in the effective use of technology. This will provide a concentrated amount of time for faculty to improve on their current skills as they proceed on their own schedules in the three-stage training model.

Thanks to a non-threatening strategy for faculty development, the classrooms of the future are becoming a reality at SFCC. Faculty members can now learn, explore and develop new computer skills -- an opportunity that they would not have imagined (or fully appreciated) just a year or two ago.

Vision and Assessment Center for Information Technology
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In Fall 1992, the Tarrant County Junior College Chancellor named a District-wide faculty committee to study computer services and resources. That spring, the committee made its recommendations--one was to establish a faculty development area on each campus for individual faculty members to work on projects and evaluate hardware and software. The next Fall, based on that faculty

recommendation, Dr. Herman Crow, president of Tarrant County Junior College Northeast Campus, created the Vision and Assessment Center for Information Technologies (VAC-IT), the only center of its kind within the District. Housed in the campus library, the Center provides a place for faculty to (1) work on group or individual curriculum projects; (2) evaluate high-tech hardware and software; (3) learn how to use high technology in the classroom; (4) attend small group workshops/seminars and (5) develop strategies that identify creative and effective methods for the use of computer technology in the teaching and learning process.

The Center opened in the spring of 1994 under the direction of a Vision and Assessment Team. Composed of two faculty representatives from each academic division, the team helps develop programs and activities for the Center, assists faculty in determining needs for computer resources, assists faculty and staff in using computers, and publishes a The VAC-IT Team serves as a liaison between the faculty and administration, providing a communication link for faculty to the administration on technical issues.

The Center currently offers two IBM and two Macintosh computers equipped for full multimedia capabilities, two color inkjet printers, two laser printers, two color scanners, and a 35mm slide maker. Software includes PowerPoint, CorelDraw, Director, Authorware, and Word Perfect. In addition, the Center has a CD-Rom collection designed for both the IBM and Macintosh and various reference books on both software and hardware. In addition, the Campus purchased IBM and Macintosh laptop computers for faculty checkout to be used in the classroom, for off campus presentations, or even for work at home.

Operating on the library's schedule, the Center is available for all full or part-time faculty and staff. Supplies are provided by the college with diskettes being the only individual expense.

Moreover, over one hundred faculty members have completed professional development courses as well as short seminars or workshops on the use of multimedia software and hardware. Courses are taught by computer science faculty and others who have developed expertise in a variety of software programs including PowerPoint, Windows, Authorware, and Corel Draw. In addition, individual faculty members present seminars on techniques or software or hardware that they have found to be particularly useful or effective. To show his commitment to the Center, Dr. Crow granted released time to one faculty member for original demonstrations and teachings.

Last summer, the President provided released time for two faculty members (one from English and one from natural sciences) to produce multimedia presentations for their courses. Using skills obtained through the professional development program and equipment in the VAC-IT, the two produced over 500 color transparencies and created animated lessons for developmental English and anatomy and physiology courses.

Numerous other faculty members have designed color transparencies or animated presentations for their classes, professional organizations, or colleagues.

Designed as a work area, the Center has become an excellent location for faculty sharing and learning. While one faculty member is working on a project, another may be looking over that individual's shoulder learning more about the computer or

the software applications. When two or more faculty members are producing, they ask advice, offer suggestions, or even serve as editors. Faculty have discovered new resources as well as new information--not only on computers but also in other disciplines.

Faculty appreciate the opportunity to work on projects without an individual outlay of money for personal equipment and software. The VAC-IT provides a chance to try out expensive equipment and programs before making a personal expenditure. Furthermore, they can produce materials in a shorter framework than relying on District graphics personnel and have total control over design and content.

Faculty who have used the facilities to produce materials for their courses and other presentations report better interest in and retention of information from the audience. Enthralled with the multimedia presentations, students attend classes more regularly, provide fewer distractions, contribute more to class discussions, and don't watch the clock. The Center's success is further evidenced by the requests for more computers because of the increased demand from faculty and staff for computer time.

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ABOUT NCIA

The National Council of Instructional Administrators (NCIA) is a private, nonprofit, professional organization affiliated with the American Association of Community Colleges (AACC). With membership in two-year institutions across the nation and Canada of over 3500, the NCIA is the largest such affiliated council.

Committed to leadership, innovation, advocacy, and development for the improvement of teaching and learning, NCIA is the national voice for the opinions and concerns of administrators of instructional programs in two-year colleges. The Council is consulted by the leadership of the American Association of Community Colleges and by other national organizations on matters of importance regarding instructional programs.

In addition to a volume of Exemplary Instructional Programs, NCIA publishes a quarterly newsletter, and, on a periodic basis, literature searches on vital instructional topics. Regional and state workshops are sponsored, and major presentations made at various annual conventions including the annual AACC meeting.

Persons interested in membership in NCIA should write to: NCIA, P. O. Box 198642, Nashville, Tennessee 37219-8642.